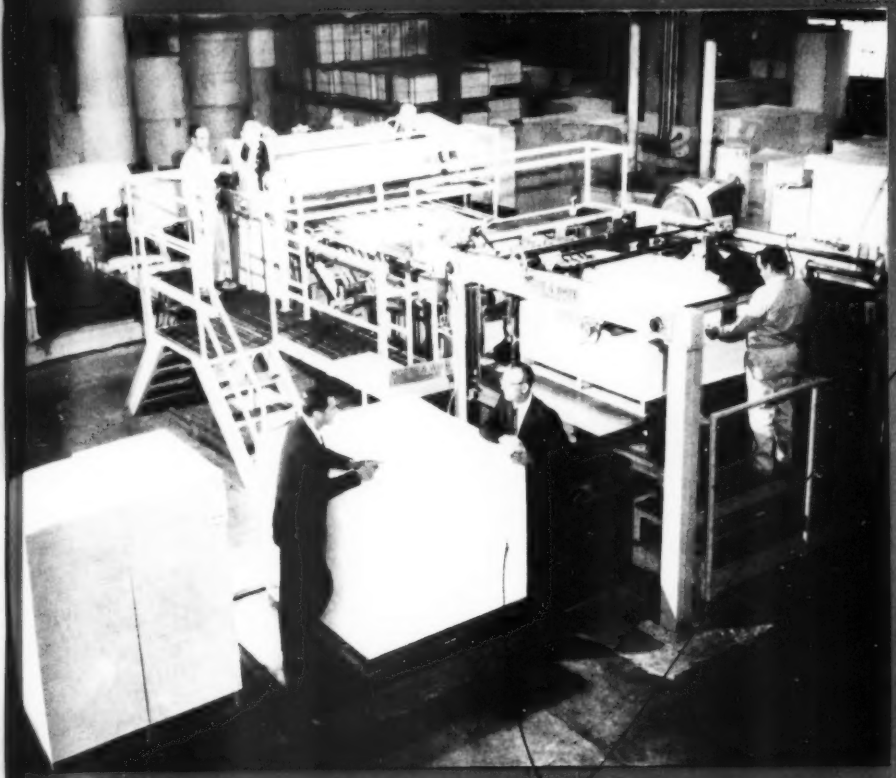
MARCH 1961

THE PAPER INDUSTRY



L. Ellis, staff engineer, and Joseph C. Callan, superintendent of finishing examining cut sheets from the R-100 cutter-layboy at Riegel.

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MAR 22 1961

TECHNOLOGY DEPARTMENT

Scott tissue and finishing operations at Mobile

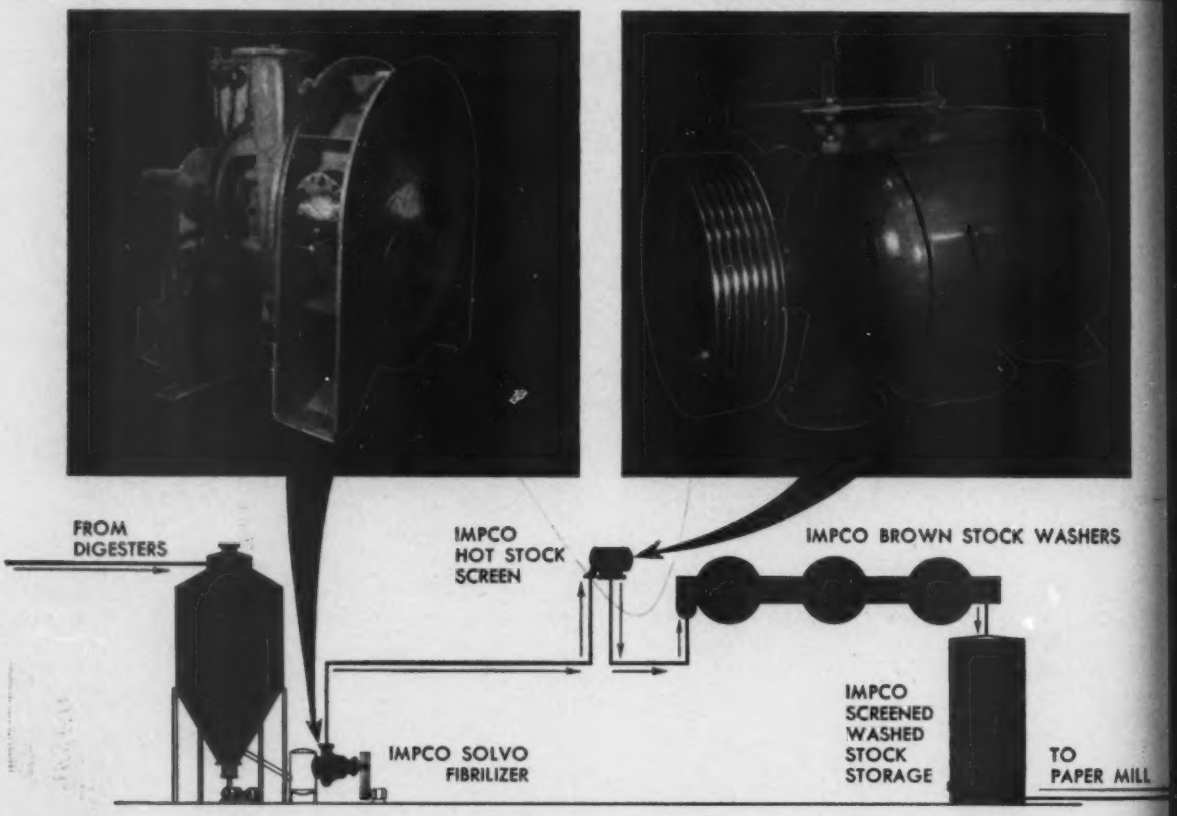
Rheology of paper coating — adhesives

Riegel Paper Co. operates R-100 cutter-layboy

Purchased and manufactured chips at Eastex

Publishers of PAPER AND PULP MILL CATALOGUE

Impco *Again* Simplifies the Pulping Process with the Fibrilizer and Hot Stock Screen



The new Impco Fibrilizer and Hot Stock Screen combination has opened the door to vast savings for the industry.

The Solvo Fibrilizer produces a combined action of pulp classification, complete soft knot defibering (not refining), hard knot shredding, higher initial yield and eliminates knot handling. Its built-in pumping action eliminates the need for a stock pump. All these operations are being accomplished for about one-half horsepower days per ton.

The new Impco Hot Stock Screen, installed directly ahead of the primary stage brown stock washer, is now producing quality pulps in several mills. This development virtually obsoletes the need for separate washed-stock screening of most paper and all board grade pulps.

The arrangement shown can be installed for high yield Kraft and Sulphite pulps with only the screen rejects requiring refining.

IMPCO

IMPROVED MACHINERY INC.

NASHUA, NEW HAMPSHIRE

IN CANADA: SHERBROOKE MACHINERIES LIMITED, SHERBROOKE, QUEBEC

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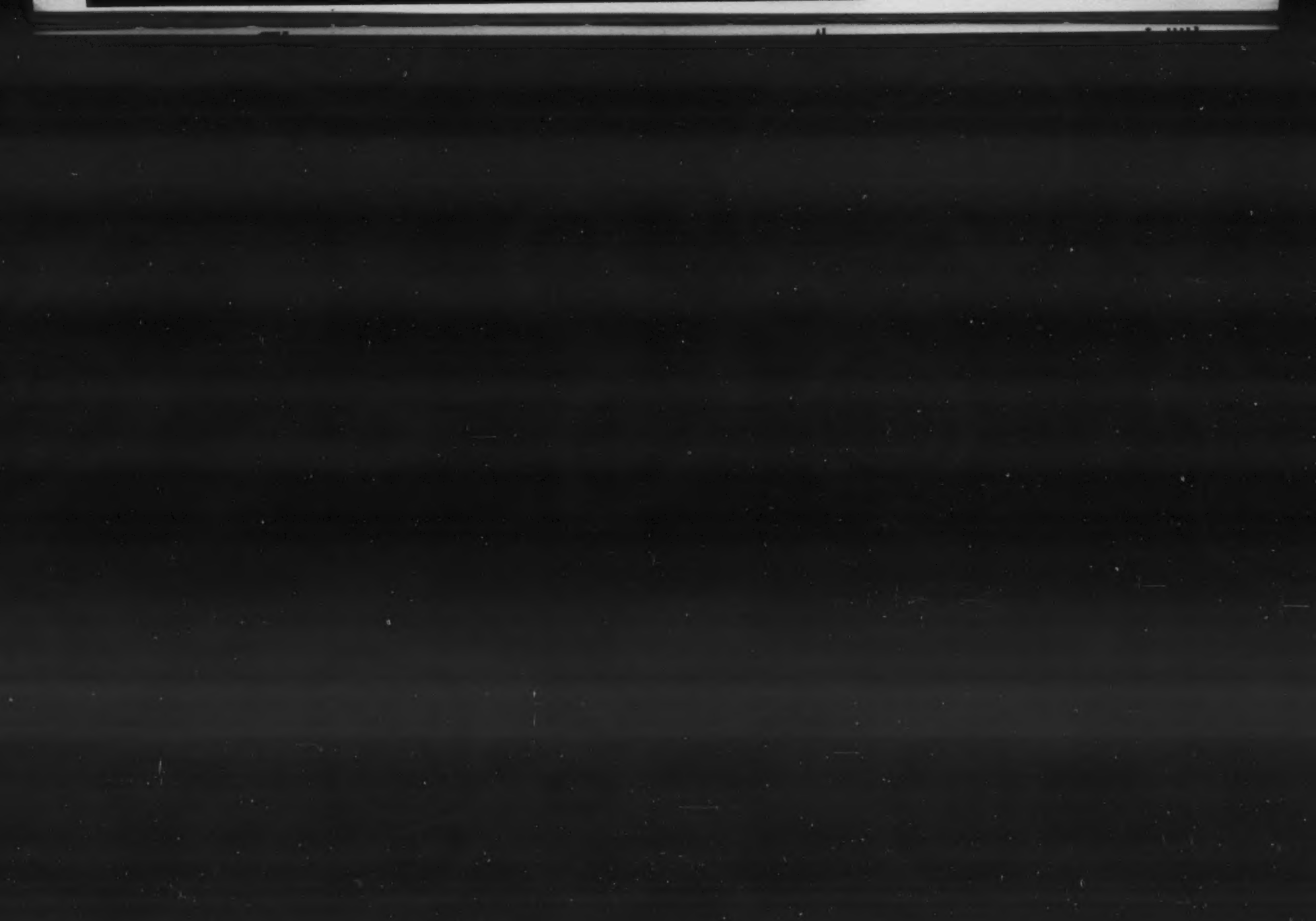

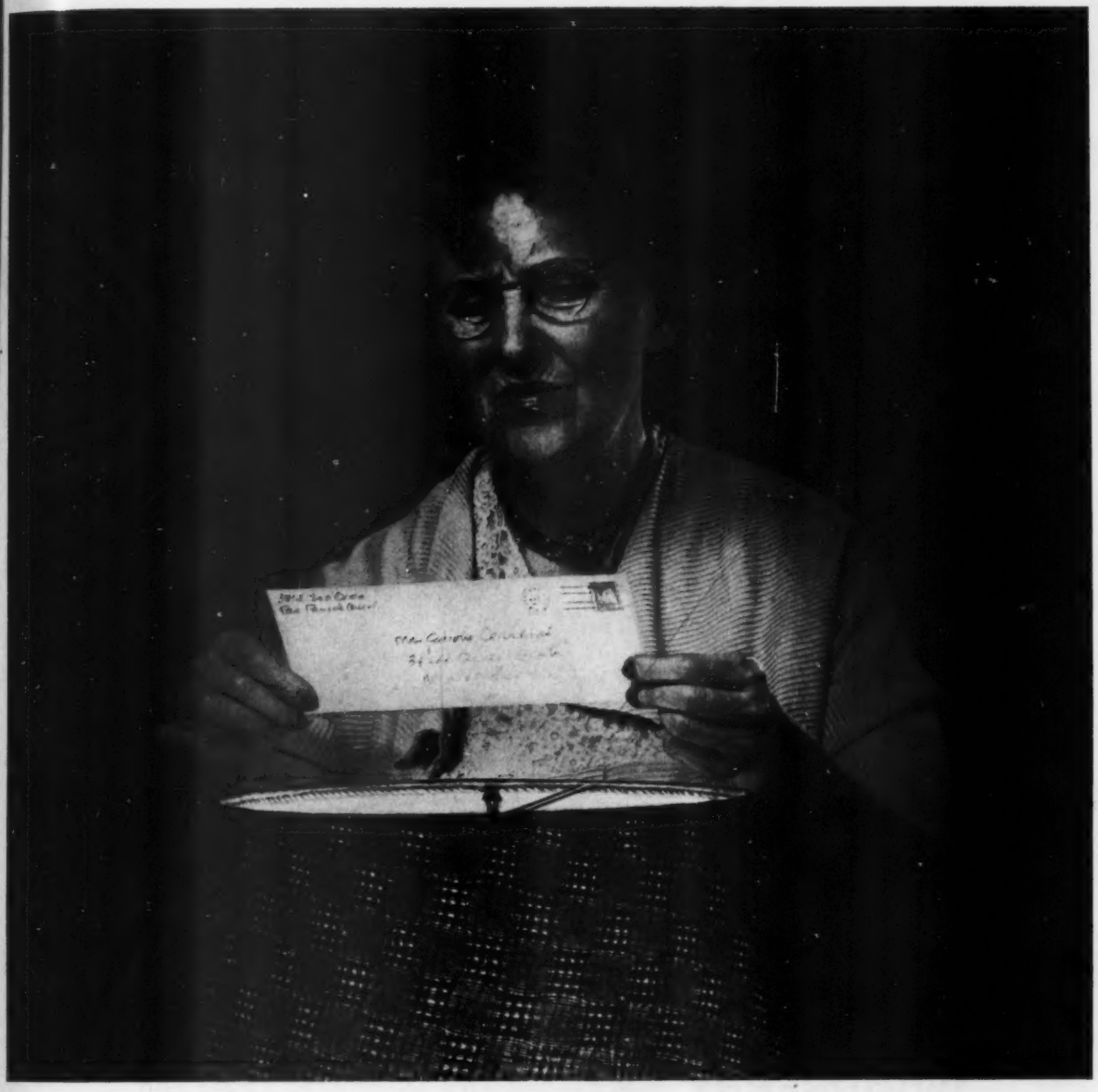

Increase opacity, lower pigment costs with Celite Fillers

Celite® diatomite fillers provide the paper industry with a low-cost way to obtain greater sheet opacity while maintaining maximum brightness.

With its unique combination of properties, Celite provides a greater opacity effect than any other comparably priced filler. Celite's irregular particle shape, fine particle size distribution and high bulk make it ideal as a partial replacement for TiO_2 pigments. What's more, Celite's excellent filtration properties cause the retention of a higher percentage of TiO_2. As a result, less TiO_2 is needed to obtain required optical properties.

It is easy to see why cost-cutting Celite has been used by paper manufacturers for nearly thirty years. For further information or technical assistance, write Johns-Manville, Box 14, New York 16, New York. In Canada: Port Credit, Ontario. Cable address: Johnmanvil.

Celite Division inert fillers and extender pigments in paper are not considered food additives as defined by FD&C Act Amended, Section 201(s).

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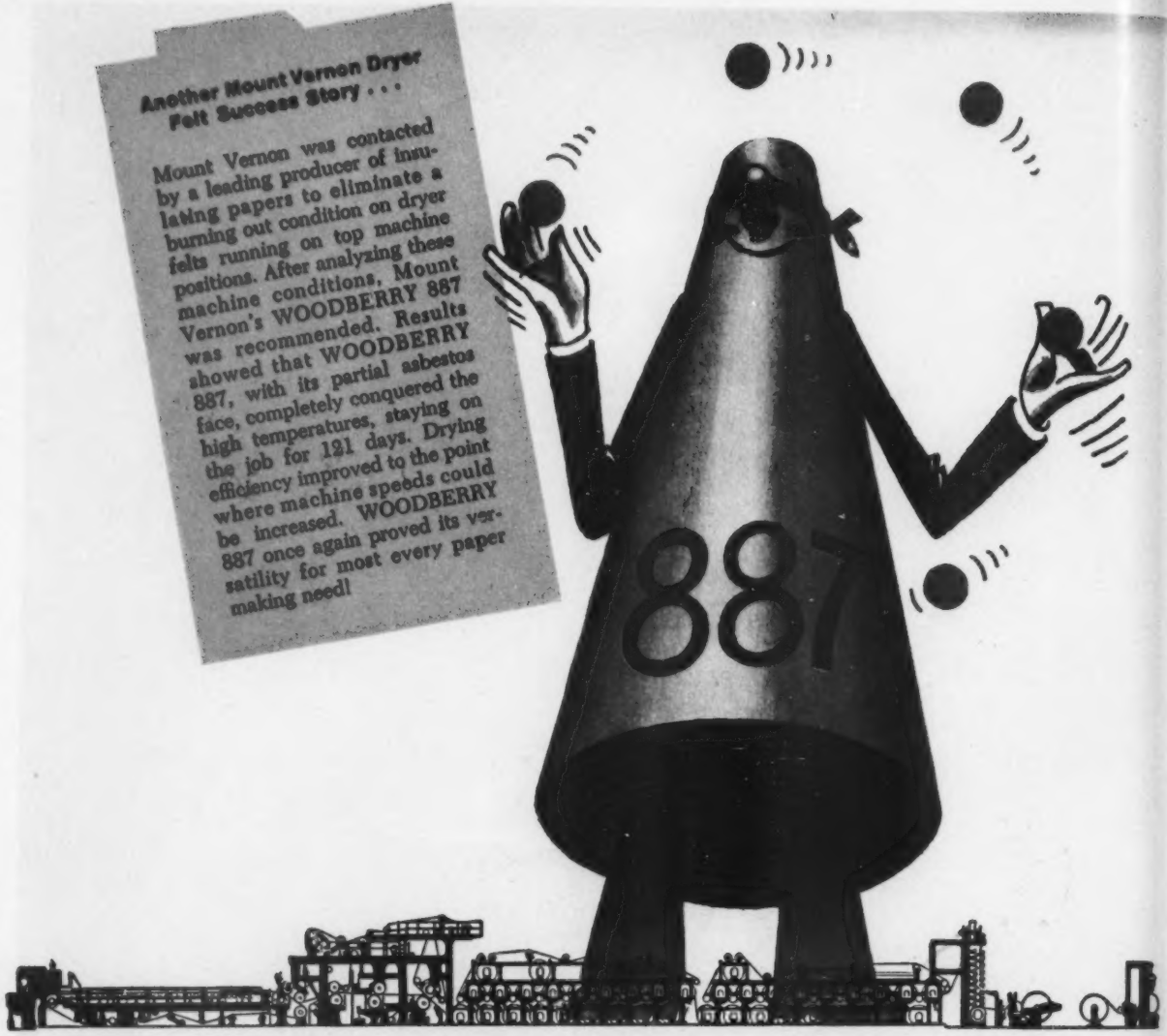
Another Mount Vernon Dryer Felt Success Story . . .

Mount Vernon was contacted by a leading producer of insulating papers to eliminate a burning out condition on dryer felts running on top machine positions. After analyzing these machine conditions, Mount Vernon's WOODBERRY 887 was recommended. Results showed that WOODBERRY 887, with its partial asbestos face, completely conquered the high temperatures, staying on the job for 121 days. Drying efficiency improved to the point where machine speeds could be increased. WOODBERRY 887 once again proved its versatility for most every paper making need!



STARS IN MANY ROLES

WOODBERRY 887—Asbestos Reinforced Dryer Felt

Whatever the role, WOODBERRY 887 is sure to turn out an exceptional performance. Engineered to fulfill requirements for a large variety of paper-making applications, this is the dryer felt that offers maximum drying and durability. WOODBERRY 887 is a medium-weight cotton dryer felt with asbestos yarns in the face, the asbestos reinforcement providing greater heat resistance than can possibly be obtained with all-cotton felts. For longer life, for greater heat resistance, for finer finished paper in countless applications . . . from the making of Kraft to fine book papers . . . WOODBERRY 887 is right for the role. Available pre-stretched and pre-shrunk, with or without clipper seams.

MOUNT VERNON DRYER FELT FAMILY—WOODBERRY 887 is just one of Mount Vernon's full "family" of scientifically designed dryer felts. There's an individual felt for virtually every paper machine position and every paper-making need.

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The Paper Industry

Technology • Engineering • Management • Production

VOLUME 41 **NUMBER 12** **MARCH 1961**

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The PAPER INDUSTRY is indexed regularly in Engineering Index and Industrial Arts Index. An index to each volume is issued annually by the publisher as a part of the April number.

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from our point of view

Should the earnings record or the productive stability determine pulp and paper industry's strength?

With a combined registration of close to 5000 and a keen interest in an unusually diversified program which included discussions on the utilization of technical manpower, new results in the chemistry of lignin, new or improved equipment and materials for pulp and paper making, world markets, and even the gold crisis and international relations, the 1961 annual meetings of APPA and TAPPI reflected a vitality that seemed in sharp contrast with the national economic mood.

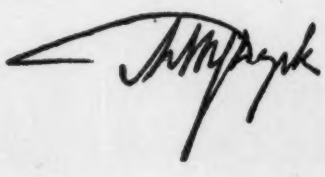
Much of the initial gloom that permeated those immediately affected by the flight-engineers' strike or that reflected a general concern over the lagging national economy was soon dispelled under the weight of (1) encouraging world statistics showing rapidly increasing trends for paper and paperboard requirements and (2) promises of increased productivity as a result of new technological developments.

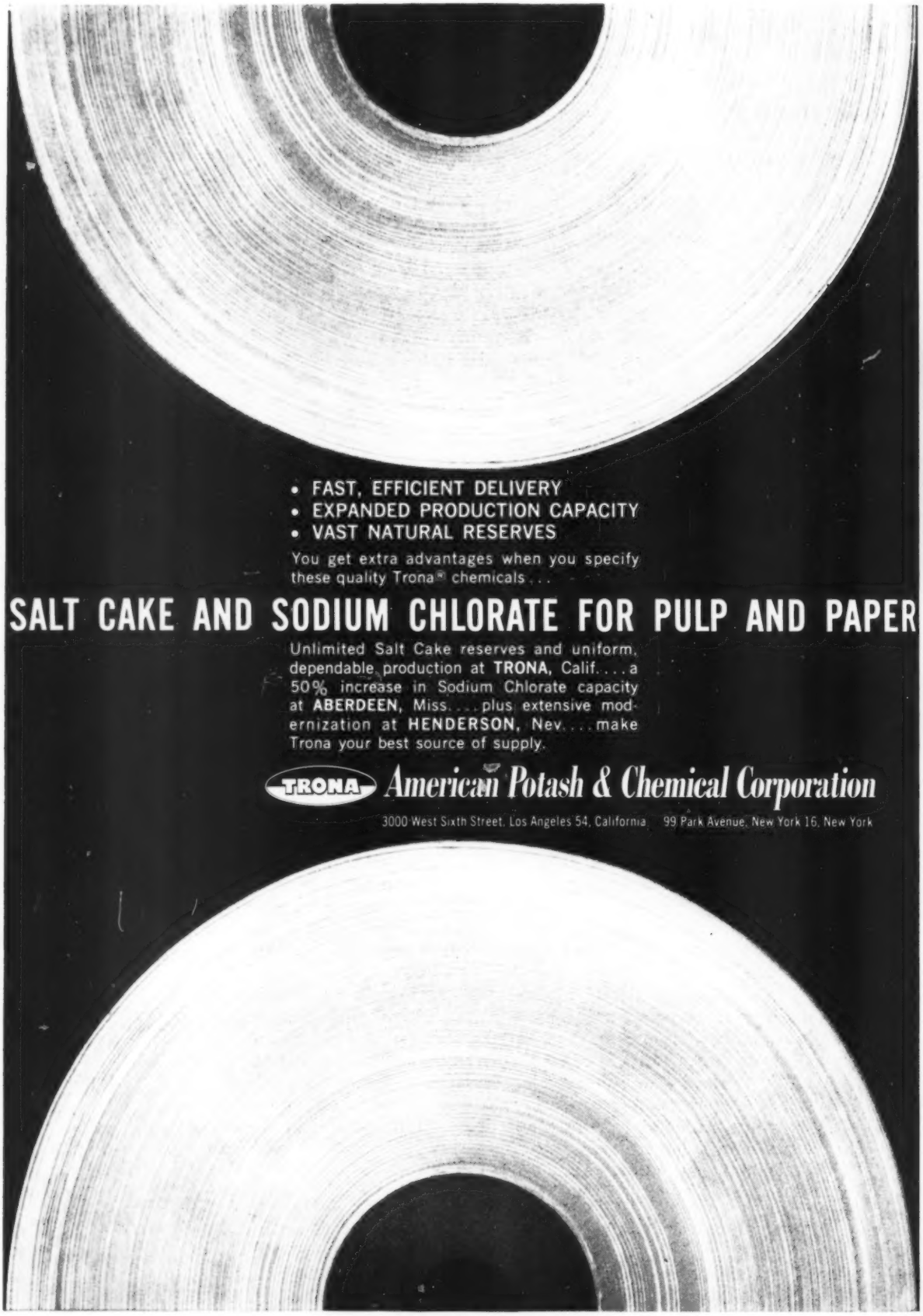
"You never had it so good", seemed to be the impact of a message by Lawrence K. Gessner, one of Wall Street's Senior Security Analysts, when he spoke of the unique advantages the pulp and paper industry enjoyed in such areas as availability of raw materials; diversified, highly automated and integrated productive facilities; reasonable labor costs and good labor relations; output of a cheap and expendable product; an assured and growing market; the excellent 5.7 per cent annual compound sales growth; and the great production stability of the industry.

Mr. Gessner, however, quickly restored the induced exuberance to a more realistic level when he cautioned that, despite all these advantages, the industry's earnings were down. In fact, he stated, total net profits over the last ten-year period have grown at an annual rate of only 0.8 per cent while inflation has progressed at an annual rate of 2.5 per cent.

It is our opinion that this discrepancy in the rate of earnings may be characteristic of an industry that requires the use of a large assembly of expensive machines and equipment and puts out an inexpensive and expendable product. Such an industry's capital expenditures cannot be planned strictly in terms of the magnitude of return on the dollar invested. While the certainty of profit return seems assured, its degree of magnitude certainly is not.

The pulp and paper industry's strength therefore cannot be based so much on its corporate profits as on its production stability. Its strength lies in the steadily rising world consumption of paper and paperboard, which in 1960 was close to 83 million tons representing a 4 per cent increase over that of the previous year. Moreover, most surveys predict strongly rising demand trends for paper and board during the next 15 years, both on the USA and the global markets. It is this production stability rather than the industry's earnings record, that should be considered in evaluating the paper industry's real and lasting future.

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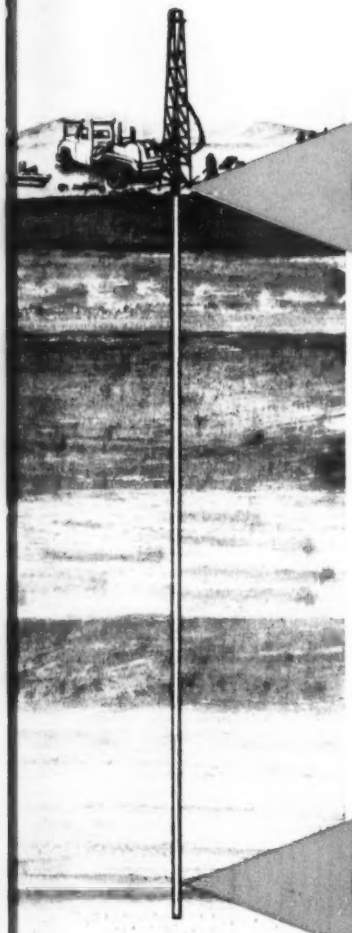

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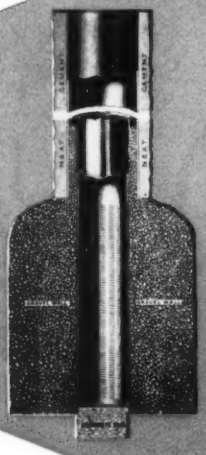
SINCE 1882

Layne Vertical Turbine Pumps are designed, engineered and manufactured by Layne in Memphis, Tennessee and nowhere else. Because pumping needs vary, there is a Layne pump for every pumping requirement—from 30 to 100,000 G.P.M. in sizes from 4 to 42 inches. Layne Pumps include Deep Well and Short Coupled (oil or water lubricated), Propeller, Mixed Flow, Regular and "In-Line" Submersible. For additional information write for bulletins 200-oil lubricated or 201-water lubricated.

has the only complete service that means Water



The Layne Gravel Wall Well is an example of Layne experience, engineering and research. This gravel packing and 134 shutter screen employment affords larger screen openings, reduced friction, reduced draw down and pumping head. It increases specific capacity and makes for more effective retention of native sands. For additional information write for bulletin 900.

From top to bottom, you can depend on Layne for the most complete water service in the industry. This complete service provides undivided responsibility for the delivery of water . . . of the quality and in the quantity required. Over 75 years of *growing* service gives the skill and technical know-how which makes Layne First in the field of water. For additional information write for bulletin 10.

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OFFERS COMPLETE
WATER SERVICE:

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BOXBOARDS

APPLETON WIRES
are good wires!

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PLANTS AT APPLETON, WIS., AND MONTGOMERY, ALA.
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People helping People...

at Huyck Felt Workshops

For the fifth consecutive year, Huyck will meet the paper industry's demand for practical training and instruction in the use and care of felts.

Huyck's Workshops are geared to stimulate new ideas, provide solutions for felt application problems, discuss machine interests of individual papermakers and explore the latest developments in felt research and development.

These Huyck Felt Workshops are open to all members of the papermaking industry whose major concern is felt operation. For further information see your Huyck Sales and Field Service Engineers or contact Huyck Felt Co., Rensselaer, New York.

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I. April 12 - 14

II. May 17 - 19

III. June 21 - 23

IV. Sept. 13 - 15

HUYCK FELTS

ck Felt Co., Rensselaer, N. Y.; Aliceville, Ala.; Division of Huyck Corporation

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1961

Your nearby Sonoco core specialist offers personalized service...

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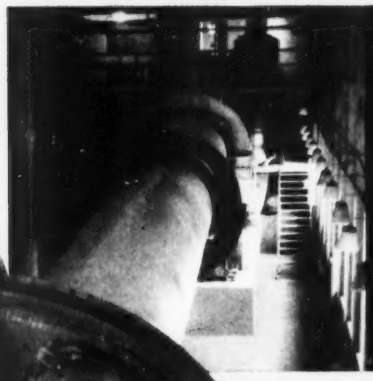
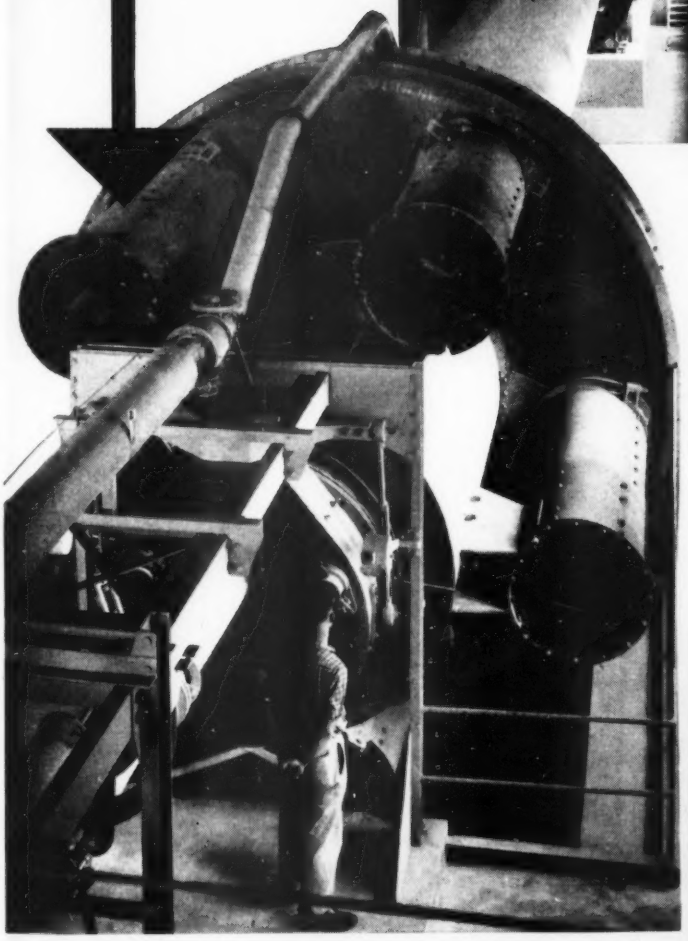
Smidth Unax Coolers

FOR ROTARY KILNS



FOR LIME, DOLOMITE, LIME SLUDGE, ALUMINA, CEMENT AND ORES



More than 600 Smidth Unax Kilns supplied in the last thirty years.

Unax cooler affords simple and economical installation; effective cooling and efficient heat recuperation. For many processes it surpasses any other type of cooler for rotary kilns.

Photos: Unax kilns in paper pulp mills

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1270 Ave. of the Americas, New York 20, N. Y.

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You've never seen a Combination like this.*....

for Paper Machine Dryers

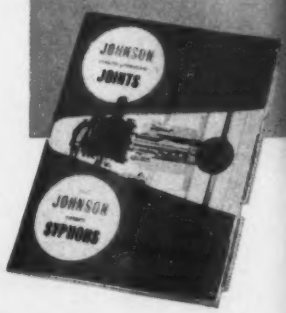
SUPER TYPE L-N
JOHNSON JOINT
with "Quick Release" Nipple

Best Design Yet for getting steam into dryer rolls with rotating syphon pipes. Needs no lubrication or adjustment. Has only a few simple parts—less chance of trouble plus easier field servicing. Assembly plate provides ready access to syphon pipe.

Floating Action—Rod supports carry all the real weight, let the rotating assembly "float" freely inside. Adaptable for machine with open or enclosed gearing.

SUPER Construction . . . *and Stamina* — Teams rock hard "Green Streak" seal rings with special Ni-Chrome plating, slashes friction load and increases service life.

Easy on . . . and off — "Quick Release" nipple uses powerful wedging action to lock joint in place. Install it—or remove it—with just an end wrench.



Trial offer still goes. We'll gladly furnish a pair of Joints and Syphons for 90-day trial in your own mill, without cost or obligation. Ask for details.

Engineers' Data Book summarizes research behind this new development, has full technical information. Ask for copy of: "Condensate Behavior in Paper Machines."

THE JOHNSTON CORPORATION

845 WOOD STREET • THREE RIVERS, MICHIGAN

Rotary Pressure Joints • Direct Operated Solenoid Valves

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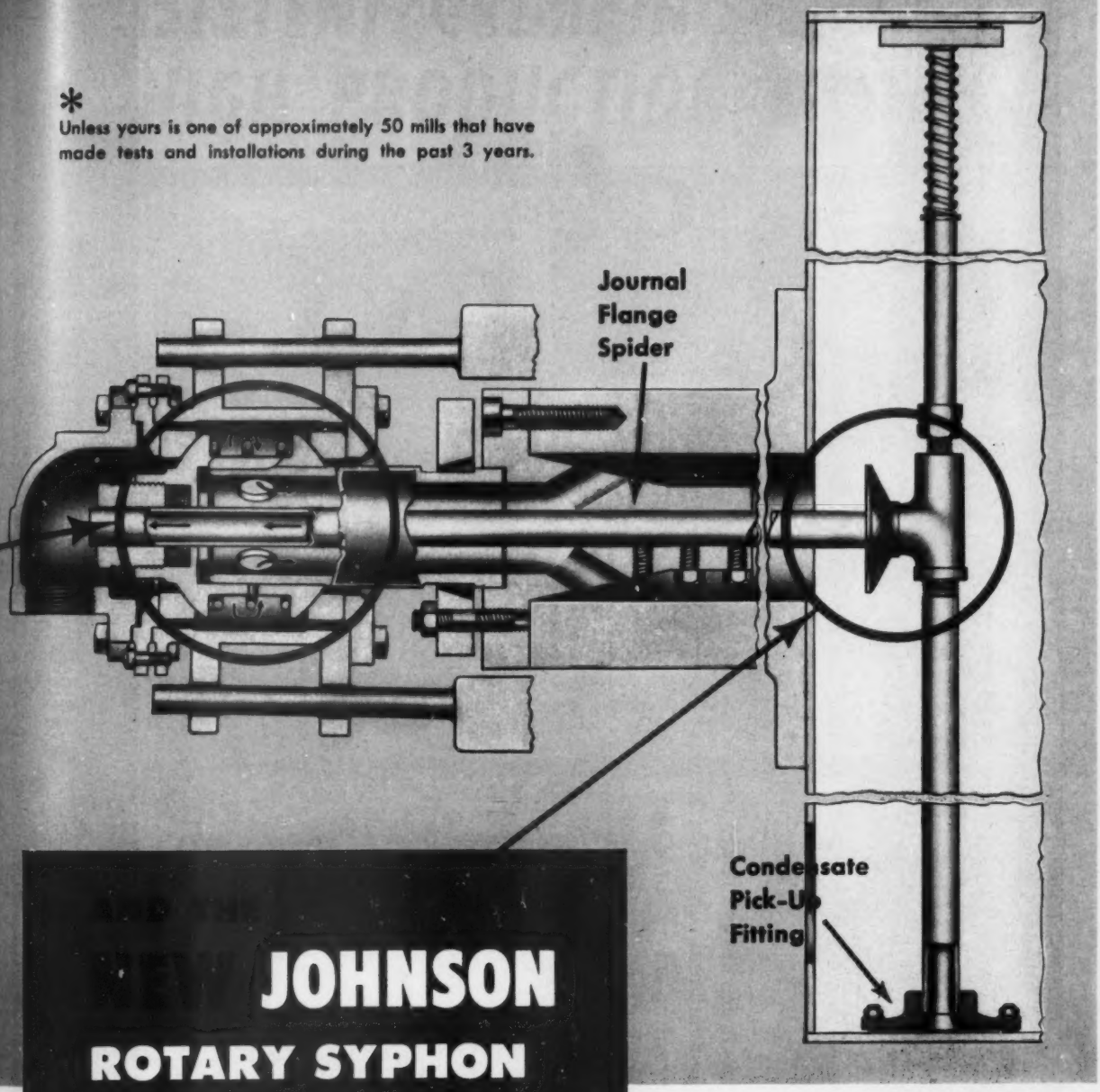
*Unless yours is one of approximately 50 mills that have made tests and installations during the past 3 years.



JOHNSON ROTARY SYPHON

Better Drainage of dryer rolls results from a new concept of condensate pick-up design. Holds condensate to a minimum. Rotary Syphon can be located any place along the dryer shell. Helps to reduce horsepower requirements.

Higher Roll Temperatures—Thinner condensate film means better transfer of heat units to dryer shell. Better drying can be translated directly into increased production.

Easier Installation—No need to get inside dryer to drill and tap dryer head. Install right through manhole. For rolls with handholes only there's even a journal-inserted rotary syphon.

Reduced Maintenance—Only a few simple trouble-free parts. Ends bearing wear caused by unnecessary water weight and prolonged "cascading." Easily removed for inspection.

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MEET THE *Lindsay* SALES AND TECHNICAL SERVICES STAFFS

These men are always ready to visit your mill and consult with you regarding any Fourdrinier wire problems that may arise.

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Charles J. Pennings

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William E. French, Jr.

E. Keith Forbes

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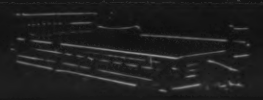
THE *Lindsay* WIRE WEAVING COMPANY
CLEVELAND 10, OHIO



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CLEVELAND 10, OHIO

1961

CONSISTENT CRIMPING QUALITY AT HIGH PRODUCTION SPEEDS

Here's the difference . . .

ORDINARY ROLL WRAPS

—especially heavy or multiple wraps—invariably have vulnerable dog-eared edges that contribute to poor appearance and high incidence of roll-handling damage.

LAMB CRIMPED ROLLS

greatly improve appearance and offer maximum resistance to handling hazards. The crimp is always uniform, tight—even in heavy and multiple wraps.

The LAMB AUTOMATIC ROLL CRIMPER *mechanically forms a superior crimp in heavy and multiple roll wraps— both ends at once in 20 seconds!*

PRODUCTION

PROVED

The Lamb Automatic Roll Crimper is the first production-proved crimper to solve the "dog-ear" problem in roll wrapping. It makes a precise, uniform, tight-edged crimp to both wrapper ends simultaneously.

It maintains consistent package quality at high production rates in heavy and multiple thickness wraps.

It automatically accepts and crimps intermixed rolls of varying length and diameter. No need to group rolls. Saves needed floor space. Adapts easily to changing requirements and conditions. Package appearance is 100% improved.

Write Lamb-Grays Harbor Company for Specifications

LAMB

Manufacturers of Roll Finishing Equipment and Complete Systems.

Lamb-Grays Harbor Co., Inc.

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Ready for the roll. Notice the absence of a shaft. Roll is moved in between lifting arms which are then lowered and closed under pressure and then elevated to unwinding position.

LANGSTON SHAFTLESS UNWIND STAND

Boost your production . . . reduce your slitting and rewinding costs

Easy, fast, completely safe. One man does everything. Operating push-button controls, he closes lifting arms, elevates roll, sets brakes.

One man can load the heaviest roll. No heavy shaft to handle. No cone tightening. No couplings to engage. No crane lifting. Just pushbuttons. This is the Langston standard shaftless unwind stand for rewinding and converting applications.

You not only save time, you also get better unwinding. Roll can be positioned laterally by push-button control—even when the machine is running. It's held firmly under pressure for complete safety throughout the unwind. Several braking arrangements can be provided to handle a wide range of grades and conditions. Available extras provide for handling very narrow rolls; for constant tensioning; for automatic braking of idler rolls; for automatic web alignment and side register control; for web oscillation; and for local or remote control.

This new Langston shaftless unwind stand can be used with any make of slitter. Available for maximum roll widths from 36 to 140 in. and diameters from 14 to 84 in. For complete information, write Samuel M. Langston Co., Camden 4, N. J.

Langston *LEADERSHIP . . . BY DESIGN*

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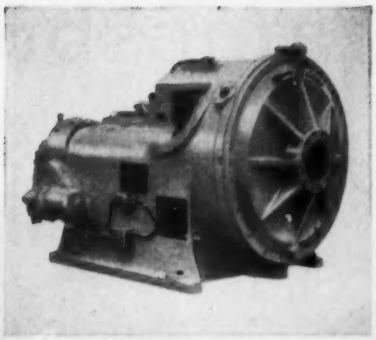
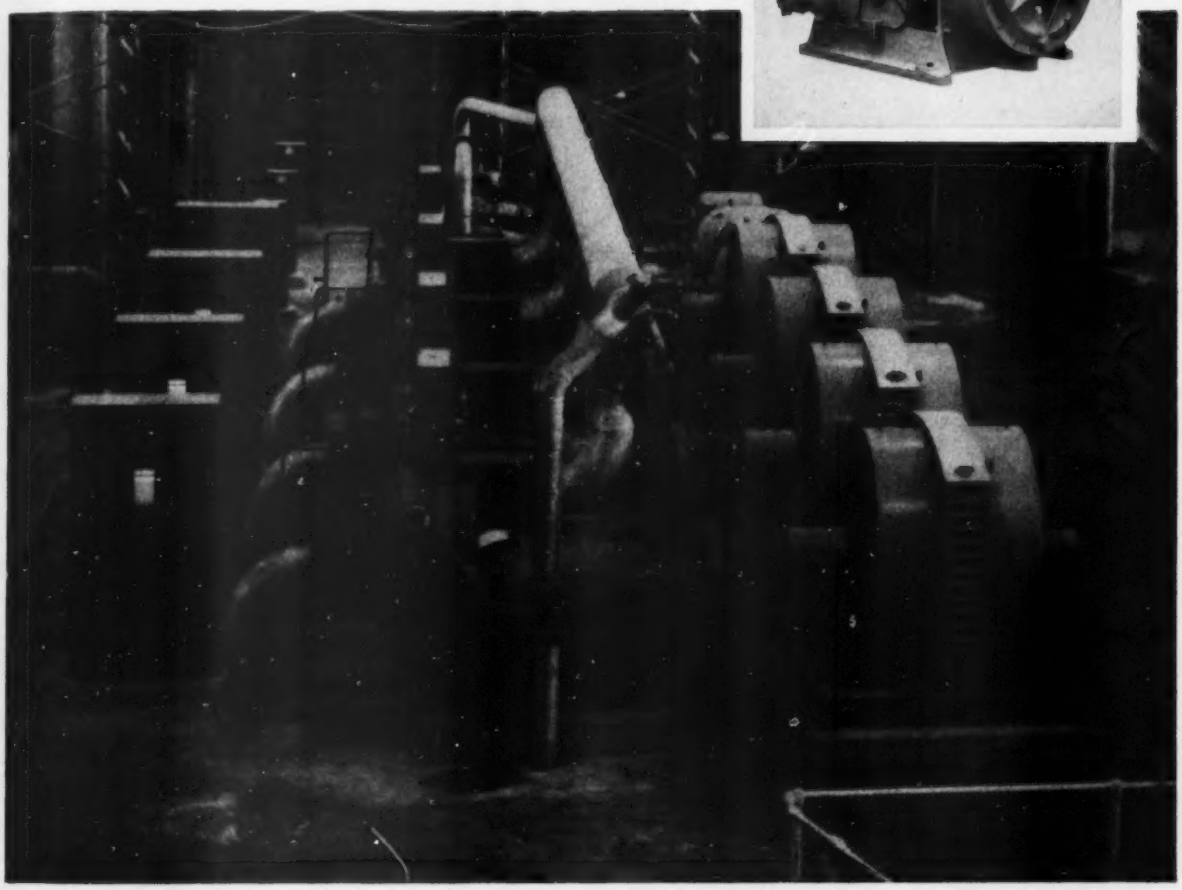
Only 4.4 HP days per ton
Used by Jones Double-D's

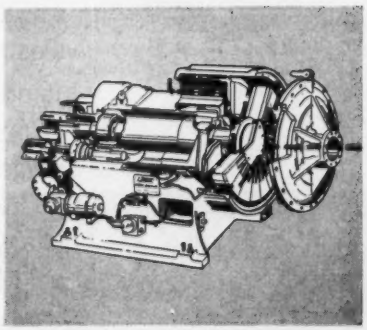




. . . at International's Pine Bluff Mill

Production schedules at International's Pine Bluff Mill call for over 500 tons of quality foodboard stock per day — from one 300″ Beloit machine. Helping to make this tonnage possible is an efficient battery of four Jones Double-D's operating in parallel for primary refining. Each unit is driven by a 600 HP motor. Working continuously since the mill was put in operation, *each Double-D has been processing approximately 140 tons per day . . . for an outstanding performance rating of only 4.4 HP days per ton* to accomplish almost two thirds of the total primary refining. Important, too, is the fact that Jones Double-D's save on floor space — since each does the work of two ordinary single disc machines.

The experience at International is typical of Jones Double-D's efficiency in many mills. Why not get high production at low HP days per ton — with less floor space in your mills, too? For full details write to E. D. Jones Corporation, Pittsfield, Massachusetts, for Bulletin EDJ-1083.



With Jones Double-D's, stock under pressure passes between two single-faced stationary discs and one (center) double-faced rotating disc. This results in precision controlled two stage refining.

E. D. JONES CORP. member BELOIT group PITTSFIELD, MASS.

Jones

PULP MILL EQUIPMENT AND STOCK PREPARATION MACHINERY

Canadian Associates:
The Alexander Fleck Ltd.
75 Spencer St., Ottawa

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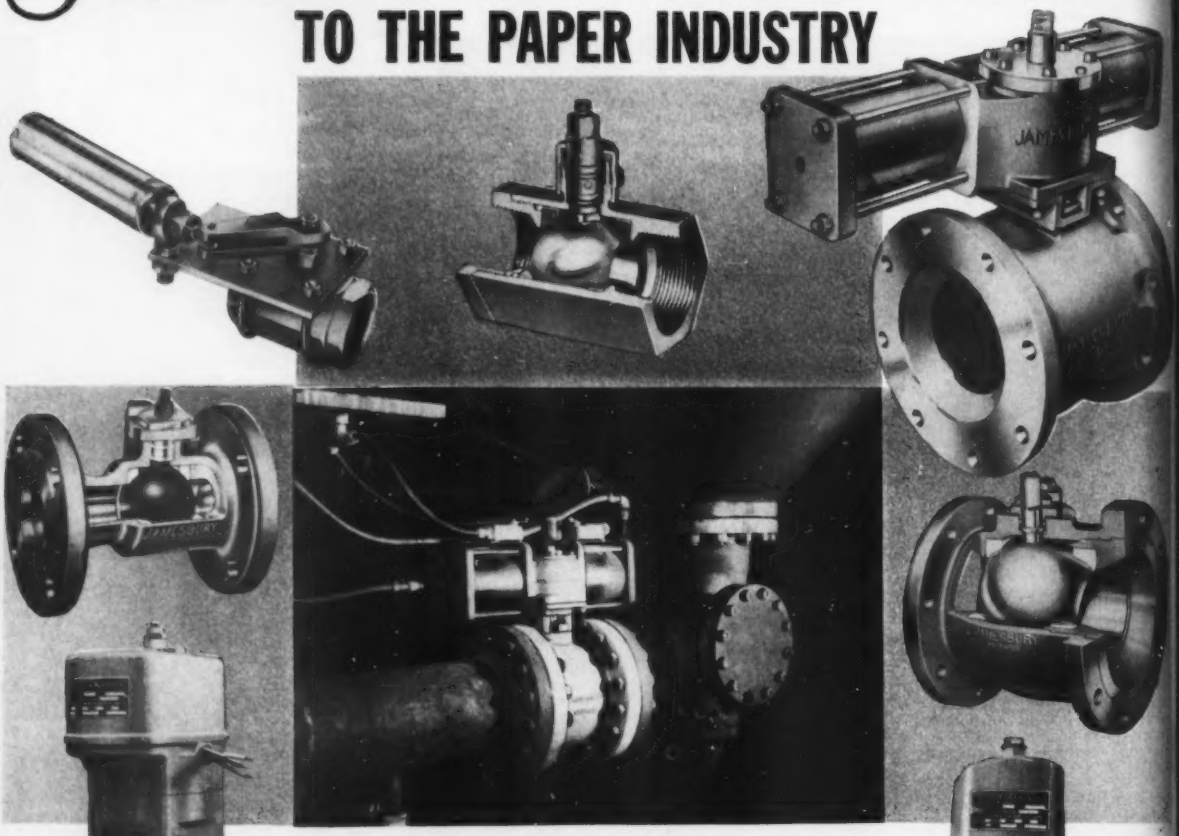
jamesbury "Double-Seal"™ BALL VALVES*

*patented

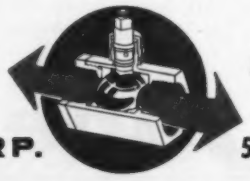
DELIVERING SPECIAL OPERATING ADVANTAGES TO THE PAPER INDUSTRY



Jamesbury "Double-Seal" Ball Valves In Operation at St. Joe Paper Co. Port St. Joe, Florida

A complete line of screwed end and flanged ball valves with or without hydraulic, pneumatic, or electric motor operators.

Jamesbury "Double-Seal" Ball Valves give ease of operation, maintenance-free performance, rugged unit body construction, high flow capacity, quarter-turn operation, drop tight shut-off . . . in a variety of pulp and paper services from spent acid lines through to the starch system.



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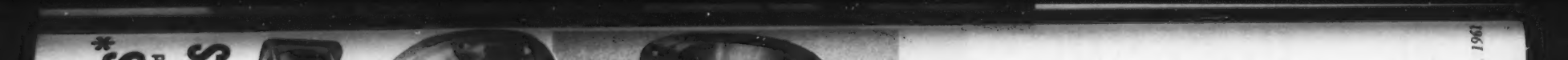

Everett C. Reed, executive of Albany Felt Company, holds synthetic fibers against a background of varied styles of chemically treated, synthetic-content, paper machine felts.

How much is enough?

Knowing the *right* proportion of synthetic fiber to wool, for example, cannot be guesswork.

When you ask us to design and manufacture a felt, these questions must be answered and answered correctly: What do you want from a felt? What performance do you seek?

As a result of long experience in selecting and blending synthetics and wools, and after thorough study of results with thousands of synthetic-content felts in actual performances . . . Albany Felt, the pioneer in developing synthetic-content felts (we hold the original patent) can assure you of the highest skill in designing and building felts to fill your specific needs.

This means improved felt performance on your machine.

Today over 60% of our felts contain synthetic fibers . . . and we are the world's largest manufacturer of paper machine felts.

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ALBANY, N.Y.
AF
Dedicated to Paper Industry Progress

N. Monmouth, Maine Hoosick Falls, N. Y. St. Stephen, S. C.
Cowansville, Quebec Cuautitlan, Mexico

TALK SYNTHETICS WITH YOUR ALBANY FELT SALES ENGINEER ▶

The facts about SYNTHETIC-CONTENT felts

The most satisfactory synthetic fibers used in felts are Nylon and Dacron. The proper synthetic, carefully blended in the right amounts with the right wools and in the proper felt design, results in a felt that gives longer life and improved performance.

Albany Felt Company's long experience in synthetic-content felt manufacture has proved these facts:

- The percentage of synthetic fiber used in a specific type of felt varies with the individual paper or paperboard application involved. (Generally, the proportion is from 10% to 45%.)
- The amount of synthetic fiber recommended rises in proportion to the extent of punishment which the felt must endure.
- The percentage of synthetic fiber in a felt is not the sole answer to better-performing felts—the careful selection and blending of synthetics and wool, plus the right felt design are also most important.
- The careful and knowing selection of the proper chemical treatment, in conjunction with synthetics, often assures longer felt life, improved finish and performance.

MOST IMPORTANT FACT OF ALL . . .

When the "rights" are added together—the *right* design, the *right* fibers, and the *right* blending—the felt will be *right* for your requirements.

TALK SYNTHETICS WITH YOUR ALBANY FELT SALES ENGINEER

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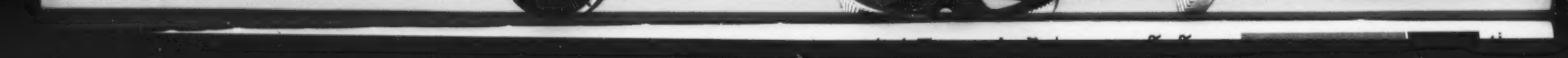
Cowansville, Quebec Cuautitlan, Mexico



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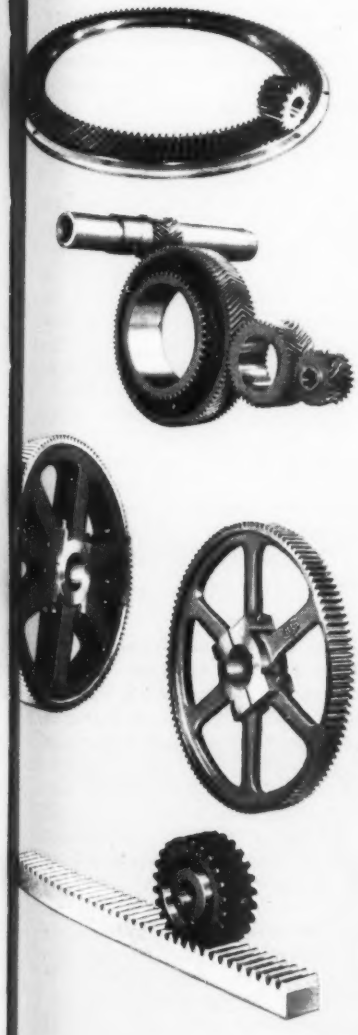

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SCOTT'S TISSUE AND TOWEL PRODUCTION AT MOBILE, ALA.

A. W. J. DYCK
Editorial Director
THE PAPER INDUSTRY

A detailed description of Scott Paper's new tissue mill and finishing operations. A unique stock proportioning system, specially designed headbox and slice, warm-up provision on Yankee dryers and finishing operations to ensure high quality standards are among the highlights of this mill.

IN 1954, Scott Paper Co. began plans for expanding its Mobile plant. In 1956, the construction of a new tissue mill began, and the mill went into operation in 1959. Once the tissue mill was in operation, Scott started its current multi-million dollar program which involves the construction of a 236-in.-wide kraft paper machine. This machine, scheduled to go into production in the second quarter of 1961, will manufacture fine quality, light-weight printing papers, as well as converting specialty grades.

The tissue mill, described in this issue, has two machines—one producing tissue and the other tissue and towel, with a combined average daily production of about 200 tons of (1) Waldorf ScotTissue and Soft-Weve bathroom tissues; (2) ScotTowels (regular and big roll); (3) Scott UHA, singlefold and multifold industrial towels; and (4) Scott Wipers, and Scott Dri-Tones windshield wipers.

The finishing department houses a number of tissue wrappers, tissue and towel winders, towel winders and folders, core winders, banding and decoring machines, etc., to make this one of the most modern finishing operations in existence.

Top management of the Mobile mill consists of J. W. McNichol, who is general manager; C. G. Ames, chief engineer; J. H. Coil Jr., assistant general manager—services; G. E. Ellis, production manager—tissue; M. B. Pineo, production manager—kraft; F. E. Stabler, wood manager; and A. L. Wiley, technical director.

J. A. Shaler is tissue mill superintendent; S. R. McIntyre is finishing superintendent; D. C. Douglas is plant engineer; Stanley A. Bazela is paper mill engineer; and W. H. Herman is finishing engineer.

Stock preparation

The stock preparation system is continuous and uses (1) slushed hardwood pulp which is piped at 4.0 to 4.5 per cent consistency directly from the pulp mill; (2) baled sulfate pine pulp from the Mobile pulp mill; (3) bleached sulfite pulp supplied by Scott's Everett mill; (4) groundwood supplied from Canada; and (5) broke.

Baled pulp, i.e. sulfate, sulfite and groundwood, is repulped in two 4,000 lb. capacity Slushmakers and then stored at 4.0 to 4.5 per cent consistency in tile-constructed storage chests equipped with agitators. There are six tile storage tanks from which pulp is drawn into the stock proportioning system.

From each of the six storage tanks, stock is regulated to 3.5 per cent consistency in in-line consistency regulators. All pulp which was repulped in the Slushmakers can be further refined in three refiners, one of which is a No. 2 Claflin and two are Royal Jordans. The Royal Jordans feature (1) custom designed tackle; (2) dynamic plug balancing at operating speeds and (3) Accru-Set worm gear adjusting mechanism.

The stock proportioning system is designed to blend five different pulps into the 3,000 gal. stock mixing chest, the level of which is controlled by a Stabilog liquid level controller. Four of the five pulps are metered into the mixing chest in a pre-set percentage ratio by passing each through 3-in. or 4-in. magnetic flow meters and per cent flow controllers. The fifth stock constituting the major flow is adjusted in any required ratio to the total flow of stock by means of a 4-in. magnetic flow meter and a flow recorder.

In addition, various dyes are metered by Rotameters and ratio controllers into the stock blending system—often as many as three dyes simultaneously.

From the stock mixing chest, the blended stock is pumped by a 600-gpm pump through a 6-in. magnetic flow meter into a tiled-linen 30,000-gal.-capacity, mixed stock storage tank. From here it is pumped to the saveall chest and then, through air-operated consistency regulators, to the machine chest. These consistency regulators are equipped with torque tubes, displacement liquid-level controllers, friction cylinders, 3-15 psi input range controllers, and pneumatically operated dilution valves.

The whole stock preparation system is continuous and automatic—with the exception of refiner loading which is done manually. All stock blending is controlled from a central control panel.

Paper machine room

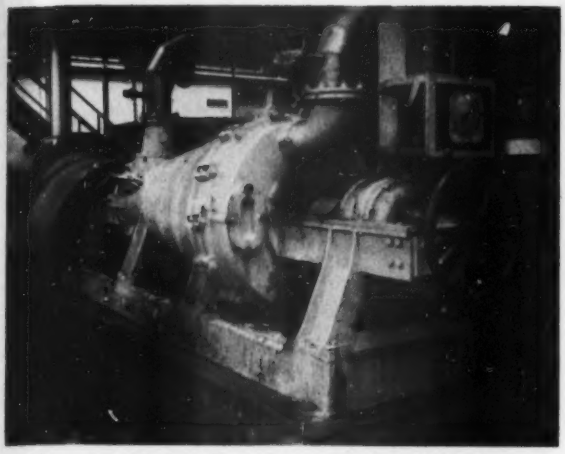
The paper machine room houses two fourdriniers, Yankee dryers and drying cylinder sections—known as No. 5 and No. 6 machines. No. 5 machine is used to make tissue and toweling grades, while No. 6 machine is used exclusively on tissue grades. Both machines have 208-in.-wide and 69-ft.-long wires.

Stock for No. 5 machine is pumped from the machine chest through an Emerson 4-K jordan to a stuff box. From here it goes through a stock dilution pump to five 24-P selectifier screens and to the suction of an 11,500 gpm fan pump which pumps it to the machine headbox.

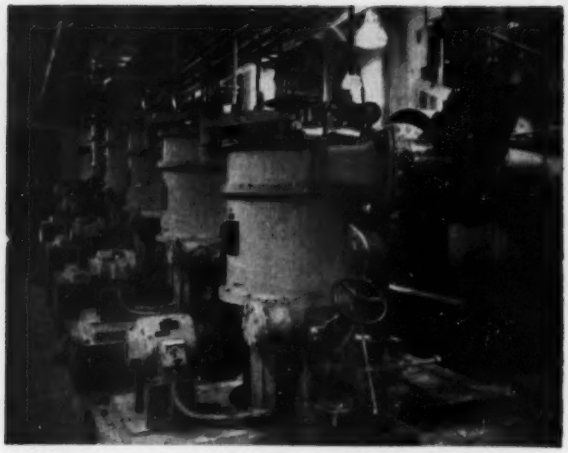
Stock for No. 6 machine is pumped through an Emerson No. 2 jordan to a stuff box, then to the suction of an 11,500 gpm fan pump followed by five 24-P selectifier screens before the paper machine headbox.

Each machine is equipped with a specially designed headbox and slice, a 37½-in.-dia. suction breast roll, a suction couch, a wire turning roll, etc. No. 5 machine is the first towel machine ever equipped with this type of headbox and slice.

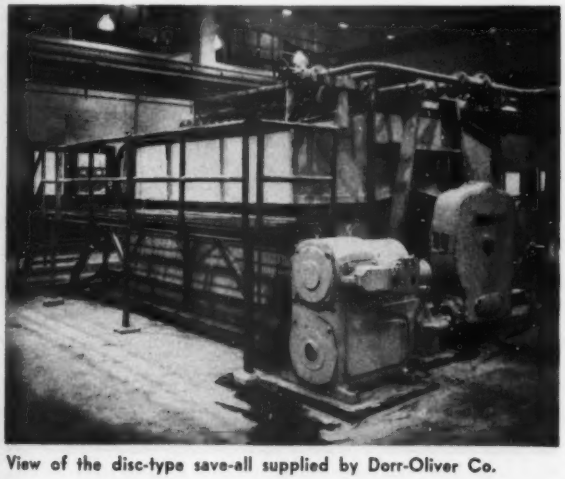
The press section of No. 5 machine consists of (1) a single-nip first press with a 30-in.-dia. suction roll; (2) a dual top-roll second press with a 40-in.-dia.



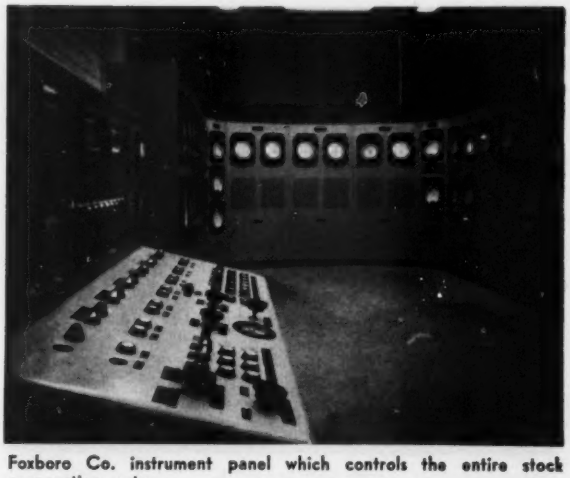
Stock is pumped through an Emerson jordan ahead of the fan pump.



View of a group of five Black-Clawson 24-P selectifier screens.

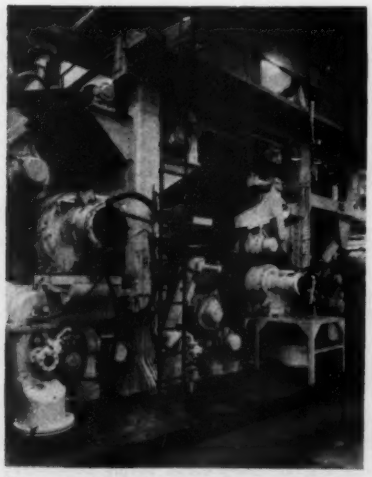


View of the disc-type save-all supplied by Dorr-Oliver Co.



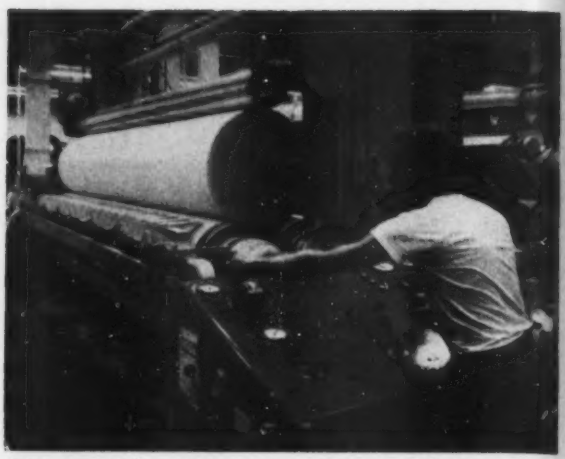
Foxboro Co. instrument panel which controls the entire stock preparation system.

View of Scott's special head box and slice on Beloit's fourdrinier.

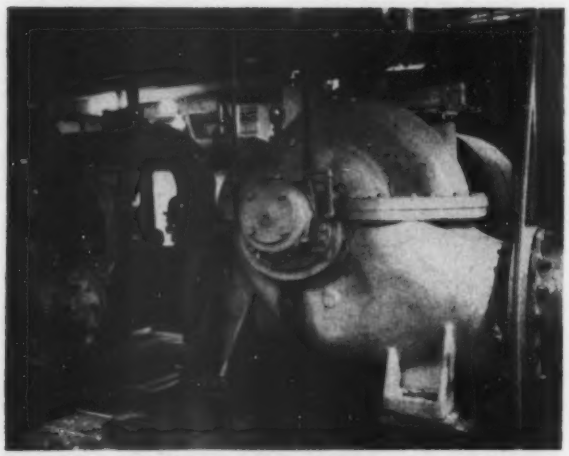


View of Beloit Iron Works press section.

View of the dry ends of No.s 5 & 6 Beloit Iron Work's tissue machines.



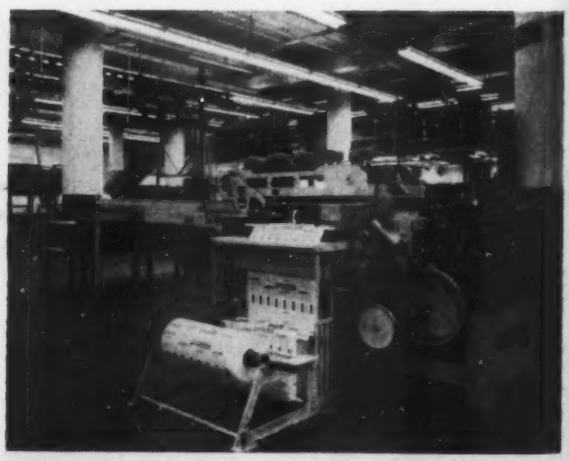
Beloit Iron Works rewinder winding two parent rolls into a roll of two-ply paper.



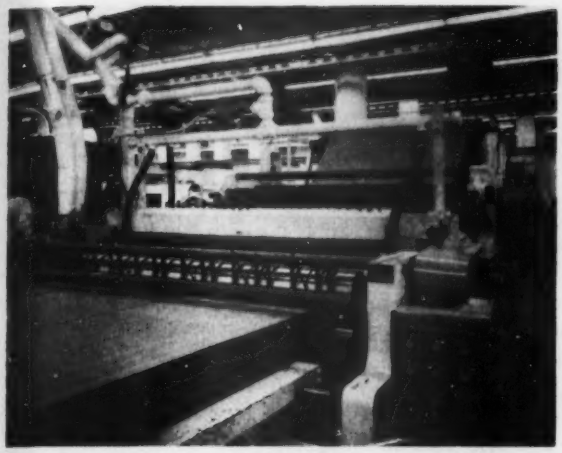
Ingersoll-Rand Co. 11,500 gpm fan pump.

Nash Engineering vacuum pumps driven by a 1000-hp steam turbine.

Ingersoll-Rand Co. air compressors supply compressed air to mill and instruments.



Hayssen Mfg. Co. multi-tissue wrapper, capable of wrapping 50 packages per minute.



Paper Converting Machine Co. single-fold vacuum interfolder with belt driven unwind stand, automatic counting device, etc.

Hayssen Mfg. Co. banding machine, equipped with Photo Electric register and floor-mounted wrapper roll stand featuring quick-connection device.

Battle Creek Packaging Machine Inc. twin-pack polyethylene tissue wrappers.

Paper Converting Machine Co. multi-fold towel folder. 17-19 cases/hr. capacity.

suction roll equipped with a 21-in.-wide suction box; and (3) a 42-in.-dia. driven suction pressure roll. The suction pressure roll (350 pli nip pressure) is required because of the heavy sheet run on this machine.

The press section on No. 6 machine has (1) a one-nip first press with a 30-in.-dia. suction roll; (2) a one-nip second press with a 39½-in.-dia. suction roll; and (3) a dual pressure roll arrangement which is instrumental in attaining higher production speeds. The pressure rolls are rubber-covered with blind drilled holes.

Vacuum is supplied to No. 5 machine by five vacuum pumps arranged in two pairs and one for the suction breast roll—each pair is driven by one motor and a separate drive motor is used for the breast roll vacuum pump. Vacuum for No. 6 machine is supplied by four vacuum pumps being driven by one common 1000-hp motor.

Each of the Yankee dryers is a 12-ft.-dia. by 213-in.-face cylinder designed for operation at 160 psi pressure. It is equipped with three doctors (i.e., skinning, creping and cleaning doctors), and a hood using air-impingement nozzles.

The Yankee hood, a combination hood consisting of three parts, is fitted closely around the dryer to hold leakage to a minimum. Both ends of the combination hood as well as the supply chamber have hinged sections for easy access. The hood is equipped with three supply and three exhaust fans.

A unique feature of the Yankee dryers is the automatic warm-up provision incorporated into the steam system. This warm-up time of 3½ hr. precludes any possibility of the operator admitting high-pressure steam into the dryer before the latter reaches a certain temperature.

Following the Yankee dryers, there are eleven paper dryers and four felt dryers on No. 5 machine and five paper dryers and two felt dryers on No. 6 machine. All dryers are 60 in. in diameter and are covered with open hoods constructed of asbestos panels. The drainage systems for the two machines are Scott-designed.

The calendar stack, following the dryer section, consists of a 20-in.-dia. solid top roll and a 24-in.-dia. solid bottom roll. The calender on No. 6 machine is served by a 40-ton air conditioning unit for better control of sheet-caliper.

Matched STEEL ROLL EMBOSSER

This new development from Paper Converting is available as a *separate installation* or an *attachment* to *re-winders, folders* or *printing presses,* and features —

- Matched steel rolls for long life and low maintenance — no "run-in" time required.
- Air loading with adjustable precision nip control
- Fully enclosed oil lubricated herringbone gears
- Tapered inner race spherical roller bearings arranged for hydraulic removal
- Automatic cleaning and lubricating for embossing rolls.

WANT TO KNOW MORE? Please write or call and we'll send you complete information and specifications.

FOLDERS, REWINDERS, EMBOSSERS, NAPKIN AND CORE MACHINES, LETTERPRESS AND FLEXOGRAPHIC PRESSES, SPECIAL CONVERTING MACHINERY.

PCMC

Paper Converting MACHINE COMPANY

GREEN BAY, WISCONSIN

Model ME-60

creative engineering and development of converting machines *since 1919*

For more data circle 119 on Post Card

The reel, driven by a 40-hp motor, is capable of winding 65-in.-dia. rolls. Both machines are served by a single 3500-fpm slitter-winder.

Broke from No. 5 machine is repulped in a stainless steel Hi-Lo dry broke pulper equipped with a steam injection system for pulping of wet strength broke. The dry broke chest located under No. 6 machine is used for repulping tissue broke.

Compressed air is supplied to the machines by two compressors. Each compressor is equipped with its own after-cooler and receiver tank. Each paper machine is furnished air by way of two headers: (1) machine air header, (2) instrument air header. All instrument air is passed through an air dryer and has its own receiver tank.

Paper machine drives

Both machines have a multiple generator sectional drive. The h. p. breakdown for each machine is listed as follows:

	No. 5	No. 6
Breast Roll	100 HP	60 HP
Primary Couch	150 HP	60 HP
Wire Turning Roll	150 HP	60 HP
1st Press	150 HP	150 HP
2nd Press	200 HP	200 HP
Pressure Roll	100 HP	100 HP*
Yankee Dryer	350 HP	350 HP
AfterDryer	200 HP	100 HP
Calender	40 HP	40 HP
Reel	40 HP	40 HP
Total	1480 HP	1160 HP

*Not in use

SCOTT'S FINISHING OPERATIONS

Finishing operations are carried out in a separate building adjoining the tissue mill. The finishing building consists of basement and two floors, with tissue converting operations largely confined to the 1st floor and towel converting to the second.

Tissue production lines

Tissue converting machines are laid out in three lines, one line producing Soft-Weve tissue, the second ScotTissue, and the third Waldorf tissue. Two core winders produce the required cores which are fed automatically to the three lines. Each core winder is designed to produce cores at the rate of 150 lineal ft. per minute.

The core winders, operating from two parent rolls, are equipped with water jacketed thermostatically-controlled electric glue pans, core forming belts, winding mandrels, and hydraulically operated core cutter. The action of the core cutter is controlled by a target assembly to cut core at any length between 45 to 90 in. The automatic rewinders used by Scott require 63-in. and 66-in. core lengths.

Soft-Weve tissue is produced on two automatic toilet tissue rewinders which can be operated at speeds of 1,200 fpm on single-ply stock and 1,100 fpm on two-ply stock.

The automatic tissue rewinders remove a paper web from a 52-in.-dia. parent roll, belt driven, to the rewinder under constant tension which is controlled automatically. The web is passed over a spreader roll to remove wrinkles prior to entering the shear-cut perforating unit which places the perforations at 4½-in. intervals. The full 63-in.-wide web then goes to the slitter section where it is slit into 14 individual webs of 4½-in.-width.

From the rewinder the stripped rolls fall into a trough which conveys them to an inspection table from which they are transferred to a conveyor. The conveyor carries the rolls to the two Model 475-TT polyethylene twin roll wrappers capable of applying 50 wraps per minute. The roll wrappers are driven by 1-hp motors and are equipped with refrigeration compressor and 4,000-watt heaters. The wrapped 2-roll packs are handpacked into cases and subsequently conveyed to the case sealer and scaler.

A Type SK-429 automatic power adjusted case gluer then applies glue to the outer top and bottom flaps of the packed cases and closes the outer and inner flaps for final sealing by an SK-603 compression unit. The case gluer is equipped with a case timer, carrier bars which convey the cases through the various operations, and glue applicators.

The cases are then conveyed to the warehouse where they are stacked on pallets. The unique conveying and case handling system is described in a separate article in this issue.

Scot-Tissue rolls are produced on four automatic rewinders identical to those used for Soft-Weve production. The wrapping is carried out on four high-speed, single-roll dial wrappers capable of wrapping 200 rolls per minute. The wrapped rolls are assembled and conveyed automatically by specially designed SK-114 Dividers, SK-111 Conveyors and SK-852 Combiners to an SK-806 Hydraulic Case Packer which is adjustable to 48 or 100 rolls of tissue and is capable of packing 16 cases per minute. The packer is equipped with an infeed conveyor, a funnel and a case-take-away conveyor. The cases are conveyed to an SK-429 case sealer and then to the distribution center in the same manner as described in Soft-Weve production.

Waldorf tissue rolls are produced on two automatic rewinders in an identical operation to that already described. Eighty per cent of the rolls are then wrapped on a 4-roll wrapper capable of wrapping 40 packages of four rolls per minute. The wrapper is equipped with an accumulator which feeds 160 individual rolls into the wrapper each minute.

The remaining 20 per cent of Waldorf tissue rolls are individually wrapped on two automatic wrappers and then packed by hand in cases containing 96 rolls per case. The hand-packed cases are then conveyed to the case sealer and warehouse in a manner already described.

Mixed color tissue roll packaging is done in the warehouse by reopening tack-sealed single color cases, repacking them in mixed colors and sealing the cases in a case sealer.

Towel production lines

Cores for towel production are made on a hydraulic core winding machine. This is a spiral core winder with hydraulically operated integral cut-off, suitable for high speed production of 81-in.-long cores. Its production rate is 150 ft. of cores per minute. The core winder incorporates a quick change-over feature for different length of cores. It is driven by a 3-hp variable speed drive with air-operated clutch for smooth start-up. Its cut-off knives are designed to synchronize with the target switch for precision cutting.

ScotTowels are produced in 150 and 250 sheet rolls on 4 automatic towel rewinders capable of operating at speeds of 900 to 1,100 fpm, depending on the sheet count of the towel roll.

Principal equipment installed at Scott Paper's Tissue Mill located at Mobile, Ala.

Stock preparation

Claflin, No. 2 ..... John W. Bolton & Sons Inc.
Consistency regulators (2), air-operated, automatic, equipped with Mason-Neilan torque tube, liquid level transmitter, friction cylinder, etc. ..... Trimbey Machines Inc.
Consistency regulators, inline type ..... Fischer & Porter Co. Div. of Worthington Corp.
Instrument panel ..... Foxboro Co.
Refiners (2), Royal Jordans, 165 ton/day capacity, custom-designed, Accru-Set control ..... E. D. Jones Corp.
Rotameters ..... Fischer & Porter Co. Div. of Worthington Corp.
Saveall, disc-type ..... Dorr-Oliver Inc.
Slushmakers (2), 4,000-lb. capacity ..... Morden Machines Co.
Stock metering system, equipped with magnetic flow meters, Stabilog liquid level controllers, and ratio controllers ..... Foxboro Co.
Stock storage tanks (10), tile-lined, including 6 stock storage tanks, mixing chest, and mixed stock storage chest; all interior joints are of corrosion resistant AR-20 cement ..... Stebbins Engineering & Mfg. Co.
Tile work, with all interior joints of corrosion-resistant AR-20 cement ..... Stebbins Engineering & Mfg. Co.

Paper machine room

Air compressors (2) ..... Ingersoll-Rand Co.
Broke chests, tile construction ..... Stebbins Engineering & Mfg. Co.
Broke pulpers (3), one HiLo with steam injection system; tile work by Stebbins Engineering & Mfg. Co. ..... E. D. Jones Corp.
Calender stacks (2), each consisting of a 20-in. upper and a 24.-in.-dia. bottom rolls ..... Beloit Iron Works
Calender stack cooling system ..... J. O. Ross Engineering Co.
Dryer sections (2), 60-in.-dia. cylinders, No. 5 consisting of 11 paper dryers and 4 felt dryers; No. 6 consisting of five paper dryers and two felt dryers ..... Beloit Iron Works
Dryer section hoods (2), open-type, constructed of asbestos panels ..... J. O. Ross Engineering Co.
Fan pumps (2), 11,500 gpm ..... Ingersoll-Rand Co.
Fourdriniers (2), removable, 208-in.-wide wire, equipped with specialty designed headbox and slice, 37½-in.-dia. suction breast roll, suction couch, etc. ..... Beloit Iron Works
Jordans (2), one Emerson 4-K and one Emerson No. 2 ..... John W. Bolton & Sons Inc.
Paper machine drive, electronically controlled, multiple generator sectional electric drive ..... General Electric Co.
Press section (2), suction 1st, suction 2nd, and pressure rolls ..... Beloit Iron Works
Reels (2), capable of winding 65-in.-dia. rolls, driven by 40-hp motors ..... Beloit Iron Works
Selectifier screens (10), 24-P ..... Black-Clawson Co.
Slitter-winder, 3,500 fpm ..... Beloit Iron Works
Steam system and drainage system (2), Scott-designed ..... Mason-Neilan Div. of Worthington Corp. and Ross-Midwest Fulton Corp.
Stock pumps ..... Ingersoll-Rand Co.
Tile work, with interior joints made of corrosion-resistant, AR-20 cement ..... Stebbins Engineering & Mfg. Co.
Vacuum system, consisting of 5 vacuum pumps serving No. 5 machine and 4 vacuum pumps driven by a 1000-hp steam turbine serving No. 6 machine .. Nash Engineering Co.
Yankee dryers (2), 12-ft.-dia., designed for operation at 160 psi pressure and equipped with skinning, creping and cleaning doctors, featuring automatic warm-up provision ..... Newport News Shipbuilding & Dry Dock Co.
Yankee dryer hoods (2), combination-type, Infinipple design with air impingement nozzles ..... J. O. Ross Engineering Co.

FINISHING OPERATIONS

Tissue converting

Case packers (2), Sk-606, hydraulic, 16 cases/min. capacity equipped with infeed conveyor, funnel, and case-take-away conveyor; infeed conveyor features SK-114 Dividers, SK-111 Conveyors, and SK-852 Combiners ..... Standard-Knapp Division of Emhart Mfg. Co.
Case sealers (4), Type SK-429, automatic power adjusted, equipped with case timer, carrier bars, glue applicator, and SK-603 compression unit ..... Standard-Knapp, Division of Emhart Mfg. Co.
Core winders, hydraulic, capacity 150 lineal ft. per minute; equipped with thermostatically controlled glue pans, core-forming belts, winding mandrels, and hydraulically controlled core cutter ..... Paper Converting Machine Co.
Dial wrappers (4), 200 rolls/min. capacity ..... Crown Cork & Seal Co.
Multi (4-pack) tissue wrappers (2), on Waldorf tissue, capable of wrapping 50 packages/min., equipped with accumulator feeding 200 rolls into wrapper ..... Hayssen Mfg. Co.
Rewinders (10), automatic tissue rewinders, each equipped with patented shear cut perforating unit, six mandrels, core loader, core cutter, glue applicator, cutoff and transfer unit, and roll stripper belt ..... Paper Converting Machine Co.
Single-roll wrappers (2), automatic, on Waldorf tissue ..... C. A. Lawton Co.
Twin-pack, polyethylene tissue wrappers (2), Model 457-TT, equipped with refrigeration compressor and 4000-watt heaters, capable of applying 50 to 70 wraps/minute ..... Battle Creek Packaging Machines Inc.

Towel converting

Automatic folded-towel machine, consisting of backstand, embossing unit, slitters, "A" and "C" folders, counting helixes, etc. ..... Chester Machine Works Inc.
Banding machine, equipped with Photo Electric register and floor-mounted wrapper roll stand featuring quick-connection device ..... Hayssen Mfg. Co.
Case sealers (3), SK-429, automatic power adjusted, with case timer, carrier bars, glue applicator, etc. ..... Standard-Knapp, Division of Emhart Mfg. Co.
Core winder (1), Model ATM automatic spiral core winder with hydraulically operated integral cut-off, 150 ft/min. capacity ..... Dietz Machine Works Inc.
Cull-Cutter, equipped with arbor and two rotary blades ..... Dietz Machine Works Inc.
Multi-fold towel folder, with belt-driven unwind stand and automatic counting device; 17 to 19 cases/hour capacity ..... Paper Converting Machine Co.
Rewinders (4), automatic, 900-11 fpm, with shear cut perforating units, mandrels, core loader, core cutter, glue applicator, etc. ..... Paper Converting Machine Co.
Single-fold interfolder, producing full-width bolt of Scott wipers ..... Paper Converting Machine Co.
Single-roll towel wrappers (4), Model F-9, 55 rolls/min. capacity ..... Package Machinery Co.
Single-fold vacuum interfolder with belt-driven unwind stand and automatic counting device; completely equipped with slitters ..... Paper Converting Machine Co.

Handling equipment

Conveyor system and handling equipment, consisting of tube-handling conveyors, tissue roll handling conveyors, specially designed turntables, tissue case handling conveyors, gravity roller conveyors terminating in case stop device, and warehouse and shipping conveyor system ..... Alvey Conveyor Mfg. Co.
Fork lift trucks (2), mast size 83 in./130 in., fluid coupling transmission ..... Yale & Towne Mfg. Co.

The operation of the towel rewinders is basically the same as that on tissue with the exception that the perforation spacing and the slit width for the rolls are different.

The 11-in. rolls from the four towel rewinders are passed over inspection tables *en route* to four single-roll, Model F-9 towel wrappers capable of wrapping 55 rolls per minute.

The wrapped rolls are then hand-packed and conveyed to a single SK-429 case sealer described under tissue production. The sealed cases are then conveyed to the warehouse.

Scott-Multifold is produced on a multi-fold towel folder equipped with a belt-driven unwind stand. The machine uses a single roll of stock. The web is cut off at 9½-in. intervals on the machine and the sheets are then carried to the overlapping section where one sheet is made to overlap the other to provide the interfolded feature when folded by the tuck and grip method. The capacity of the multi-fold machine is 24 to 26 cases per hour, each case consisting of 3,750 towels.

The multi-fold machine is equipped with trim-slitters only, so that a full-width bolt of towels is discharged on the delivery tapes. This bolt is later cut on a saw to the prescribed individual towel lengths.

Dri-Tones for wiping automobile windshields are made on a singlefold vacuum interfolder equipped with a belt-driven unwind stand. The interfolder operates from two parent rolls. As the two webs enter the machines, they are cut off 180° out of phase to obtain the overlapping and interfolding feature when folded by the tuck and grip method. The machine is completely equipped with slitters and delivers the Dri-Tones in the required widths.

The Dri-Tones are separated by hand into packages containing the required number of towels—an operation facilitated by the automatic counting device on each interfolder which marks the count towel as it is being delivered to the discharge table.

The separated towels go to a towel banding machine equipped with a floor-mounted wrapper parent roll stand that features a quick-connection device to facilitate rapid connection and disconnection from the banding machine. The machine centers the wrapper on the package with registration, both edgewise and in cut-off direction, held to $\pm\frac{1}{8}$ in. by Photo Electric register. The machine is equipped with exclusive glue length adjustment, and the glued flaps are fully sealed, pressed and dried by the time the towel package is ejected. The banded packages are then hand-case packed and the cases sealed in an SK-429 case sealer.

Scott Wipers are a lighter-weight windshield towel than the Dri-Tones. They are made on a single-fold interfolder almost identical to the one described under Dri-Tones. This product, however, is hand-banded, hand-case packed and sealed in the same SK-429 case sealer located on the Dri-Tone line.

Scott UHA towels for industrial use are made on an Automatic Folded Towel machine which consists of (1) the parent roll backstand which holds the 60-in.-dia. parent roll of towel paper; (2) the special embossing unit (equipped with belt drive to drive the parent roll) which embosses the paper to the required pattern; and (3) the towel machine which does the slitting, folding, cutting, counting, compressing and inserting of towels into cardboard sleeves.

The towel machine unit first spreads the web to take out any wrinkles. It then slits the web into three

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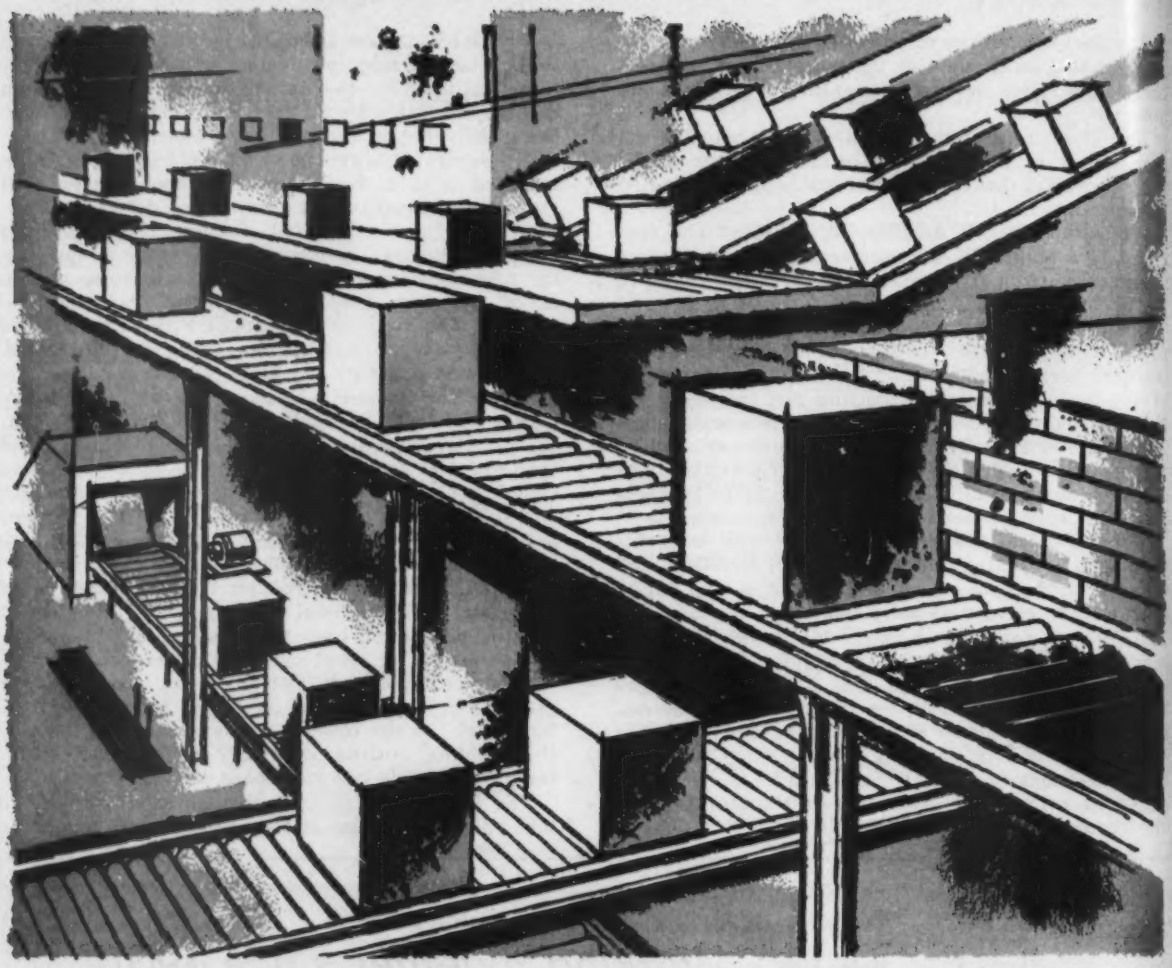

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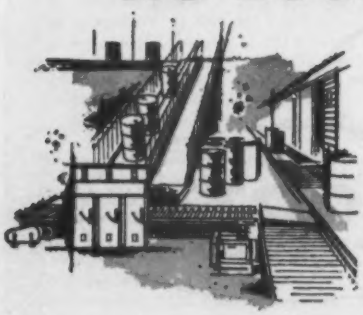

Stalled by traffic jams in reserve stock areas, and on the loading docks?

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Hindered by slow movement between floors?

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Alvey's creative conveying system engineers have been eliminating these expensive "profit eaters" for years.

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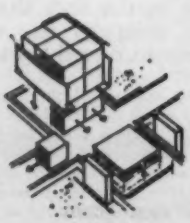
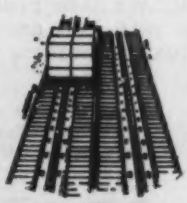
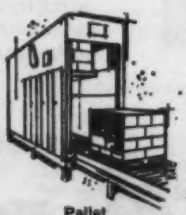


De-Palletizer

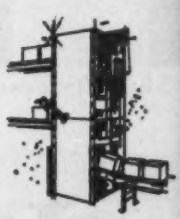


Air Chain



Pallet Loader

Spiral Conveyor



Vertical Indexing Conveyor

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strips which are then pulled through the "A" folder to be folded in half. The folded sheets go to the "C" folder which folds-over about ¼ the width on each side. The towels are then cut to length, and dropped into the counting helixes. Here they are bunched up into packs of 150 and are then pushed into the sleeve loader. The sleeve loader is moved forward automatically, the cardboard sleeve slipped onto the loader by hand and the pack pushed into the sleeve. The sleeve-packages are hand-case packed and sealed on an SK-429 case sealer.

In order to maintain the high quality standards set for the production department of Scott Paper Co. in the bathroom tissue and towel departments, a certain proportion of the output is classed as cull by quality control.

To return the cull to the broke chest without contamination by the core, a cull cutter is used. This machine is equipped with two rotary blades, one of which cuts the paper away from the core while the other blade runs in a key-way and cuts the core after the tissue has been removed. The cutting blades are dressed by grinding wheels so that clean removal of the tissue is obtained.

ALVEY CONVEYOR SYSTEM HANDLES SCOTT PRODUCTS THROUGH FINISHING OPERATIONS TO WAREHOUSE AND SHIPPING

THE material handling system at Scott Paper's tissue mill and finishing plant in Mobile, Ala., is one of the most excellent examples of engineered integrated conveyor systems in the paper industry.

Actually, the solving of the associated material handling problems involves the use of three systems of conveyors.

These three systems are all composed of different types of conveyors. However, they are all arranged in the production plan so that the operations required to produce the end products are actually integrated by the functions which the conveyors perform in moving materials from station to station and eventually to the warehousing and shipping center.

The tube-handling system

These conveyors are belted type specially manufactured by Alvey Conveyor Mfg. Co. of St. Louis to handle various diameter, length and weight tubes from core winders to the tube bins (Figs. 1, 2 and 3).

Fig. 1. Alvey single-belt conveyor carries 30 tubes per minute from the core winder to two tube bins that supply the tissue winders.

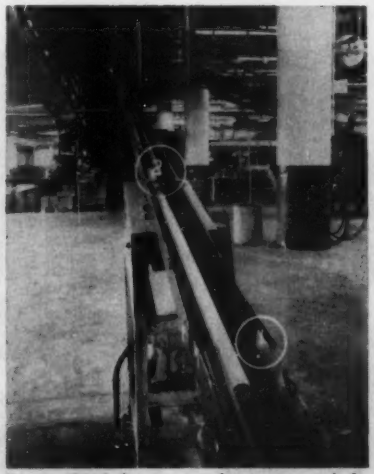

Fig. 2. Circled area 1 indicates manual diverter which permits alternate diversion of tubes into two-lane system which begins at circled area 2.

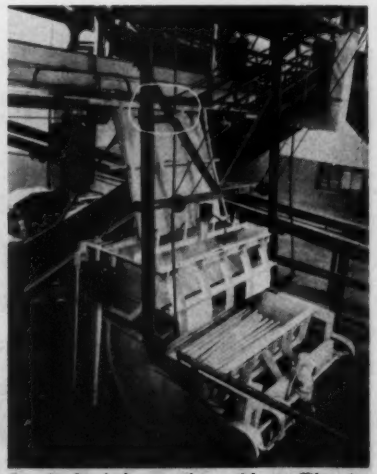

Fig. 3. Circled area shows "drop-off" point where tubes are diverted into one of two tube hoppers — the stationary hopper and the traveling bucket.

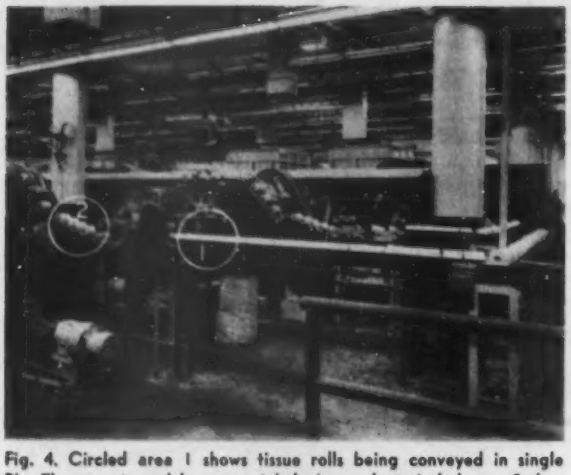

Fig. 4. Circled area 1 shows tissue rolls being conveyed in single file. They are turned by a special device and at circled area 2 they are entering roll wrapper in crosswise position.

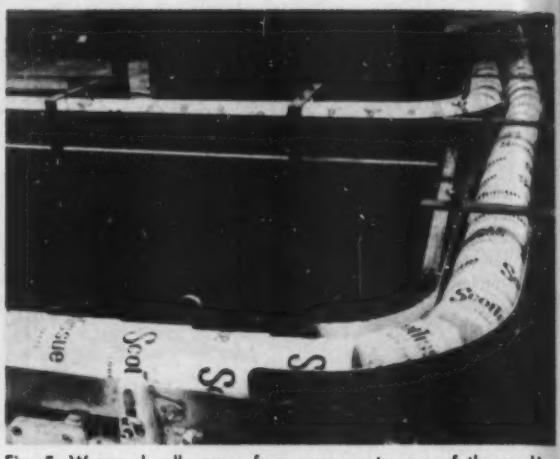

Fig. 5. Wrapped rolls move from wrapper to one of the packing areas. The conveyor features special belting, turntable devices, and mechanical arrangement for full protection of the rolls.

Fig. 6. The conveyor system serving the packers features specially designed and arranged sections that remain in tilted position when carton is being filled.

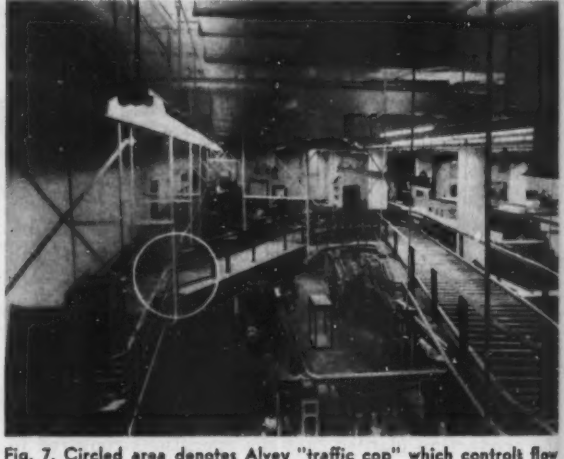

Fig. 7. Circled area denotes Alvey "traffic cop" which controls flow of cartons at a point where cartons from two packing areas are merged into single lane.

Fig. 8. Another traffic cop (circled area) controls traffic where cartons of towel products merge into single conveyor lane carrying products from tissue sealers.

Fig. 9. Over 20 types of Scott products are moved over the Alvey conveyor system into the warehouse where they are loaded by fork lift trucks into railroad cars or trucks.

Tissue roll-handling system

Another system of conveyors with special features are those that carry rolls of tissue from the continuous tissue winders to the wrapper (Figs. 4, 5 and 6). There are 10 winders from which this system of conveyor receives and dispatches products to the wrapping stations. Some of the winders are capable of an approximate production rate of 40 to 80 rolls per minute, 100 rolls per case, dependent on sheet count per roll.

The tissue roll conveyors are engineered to carry unwrapped rolls of tissue from continuous winders to wrappers with tube cores in horizontal position parallel with center line of conveyors.

The conveyors carrying rolls of tissue from wrappers to packers are arranged to accommodate two different ways of packing.

Materials wrapped by one group of wrappers go to automatic hydraulic packing machines. From another group of wrappers, they are conveyed to hand packing stations.

Rolls of tissue that are fed to the automatic packing machines are moved to those stations with tube cores horizontal and parallel with center line of conveyors.

The rolls of tissue that are moved to the manual packing stations are turned by special manufactured devices designed into the conveyor system and are fed to these packing stations with cores in a perpendicular position with center line of conveyor.

Inspection stations are located along the route of this conveyor system. At these points, the conveyors are constructed so that operators or inspectors have a maximum view of the rolls as they pass.

The roll conveyors are specially troughed. The mechanical arrangements within the conveyors and system assure that, should a blocking condition occur at any point in the system, little, if any, pressure is exerted by one roll of tissue against the other. Thus, the uniformity of shape of tissue rolls is assured, as they move from winders to wrappers to packing.

Specially designed turntables are located throughout the system to carry rolls around 90° turns.

Case-handling system

Another system of conveyors is used in handling cases of tissue from the packing stations, through sealing equipment, and on into the warehousing and shipping building (Figs. 6, 7, 8 and 9).

This particular system of conveyors has the potential of handling 18,000 cases of 36 different brands of Scott products every 24 hrs.

The cases travel from the packers to the sealers in an upright position with top flaps open and bottom flaps closed, but not sealed. As the cases leave the sealers, they pass over a case stamper. This is a specially designed section of conveyor on which the stamper is mounted.

After cases leave the sealing equipment, they proceed through another section of conveyors. This conveyor is arranged (by manual means) so that most of the cases are dumped lengthwise onto a section of gravity roller conveyors.

All size cases continue on this gravity roller section until they reach a case stop device.

This device positions them in such a manner that they are dumped onto the next section of conveyor on their "width surface".

This section of conveyors begins the network of the "live roller conveyor" system that services the warehousing and shipping building.

This building has approximately 40,000 sq. ft. of floor space.

The shipping docks can accommodate six 40-ft railroad cars. Another shipping dock will allow loading of 6 over-the-road truck trailers.

The roof of this building is of sufficient height to allow stacking of Scott products up to 16 ft. high.

The conveyor system that carries products to this building is so arranged that the manpower employed in dispatching cases can conveniently send the materials to either the truck or rail loading docks or into the storage area.

STRUCTURAL ASPECTS OF SCOTT'S TISSUE MILL

PAUL S. MORMINO
Chas. T. Main Inc.

UPON completion of a study of soil conditions in the summer of 1955 at Scott Paper Co.'s Mobile, Ala., plant, Chas. T. Main Inc. was authorized to proceed with plans and specifications for construction of a 120,500-sq.-ft. structure. The new construction included a paper machine building housing two tissue machines, a stock preparation area, a finishing building, and a combination shipping building and warehouse.

Site preparation

The preliminary study made on the proposed site indicated that it was suitable for pile foundation, with

some draining and the placement of compacted fill in certain areas so that footings could be employed for the lighter loads.

Test borings were conducted throughout the area using rotary drilling methods and recovery of standard 2-in., split-spoon samples. These borings revealed the existence of continuous non-cohesive material over the major portion of the site. Some borings disclosed a few thin lenses of relatively stiff yellow clay.

The area around the north and east sides of the proposed buildings was raised approximately 20 ft. To accomplish this, 150,000 cu. yards of material was pumped from the bottom of adjacent Mobile River. After the hydraulic fill had dried out, it was stabilized by a layer of sea shells which later served as a base for the pavements.

Design requirements

The broad specifications for the structures called for earthquake-resistant buildings able to withstand horizontal wind loads up to 50 lbs. per sq. ft. Floor areas were designed to support live loads varying from 300 lbs. per sq. ft. in the shipping and warehouse building to 750 lbs. per sq. ft. in the stock preparation building.

Foundation and structure

The three structures are supported by a total of 3,400 cast-in-place concrete piles of 40-ton capacity and an average length of 20 to 30 ft. depending upon the soil characteristics load of each area.

The substructure of the stock preparation building and paper machine building are of reinforced concrete mat. Those of the finishing, shipping, and warehouse buildings are of reinforced concrete beams, girders and slab.

Various types of wall construction were considered, which included some of the most exotic types. However, in the interest of durability, overall appearance, cost and maintenance-free characteristics, the conventional brick face and block wall with a minimum of window area was chosen.

The stock preparation or pulp storage building has a floor area of 4900 sq. ft. with the roof elevation of 42 ft. It is of reinforced concrete up to and including the operating floor (20 ft. above ground floor). It combines columns, beams, girder and slab construction. The framing above the operating floor is of structural steel. The roof is flat with a steel frame and metal deck with 2-in. insulation and topped by 4-ply tar and gravel. Exterior masonry walls are a combination of 4-in. face brick backed up with 8 in. concrete block. The interior walls are 8 in. concrete block.

The paper machine building 342 ft. by 135 ft. consists of a ground floor, operating floor and mezzanine rising to a height of 70½ ft. Like the stock preparation building, it is of reinforced concrete up to and including the operating floor combining column, girder, beam and slab construction. Framing above the operating floor including the mezzanine is of structural steel. Building was designed to support live loads as follows: ground floor, 750 lb. per sq. ft., operating floor, 500 lb. per sq. ft., and mezzanine, 250 lb. per sq. ft. The ceiling is of pre-cast reinforced concrete panels attached to the bottom chord of the roof trusses. The roof is flat with steel frame, reinforced concrete deck, 2-in. insulation, and 4-ply tar and gravel.

The finishing building 160 ft. by 210 ft., covering a floor area of 33,600 sq. ft. consists of a ground floor, operating floor and second floor. Ceiling height of each floor is 20 ft. It is of flat slab construction from ground floor to roof which is covered with 4-ply tar and gravel. Exterior walls are of 4 inch face brick with 8-in. speedwall back up. Interior walls are of 8 in. concrete block.

Adjacent to the finishing room is the combination shipping and warehouse building designed for the efficient storage and movement of finished goods. It covers an area of 36,000 sq. ft. and has loading platforms and 3 railroad tracks within the building. It is of steel frame construction from ground floor to roof which rises to a height of 46-1/6 ft. The roof is flat of steel frame and metal deck covered with 4-ply tar and gravel. Exterior walls on the south side are of 4-in. face brick backed by 8-in. concrete block. The north end is of temporary stud and plywood while the east side of the warehouse is of 8-in. concrete block.

All buildings are equipped with sprinkler systems and complete fire protection, and toilet and locker facilities throughout the plant are adequate for a personnel of 570.

Lighting

The lighting specifications vary from building to building depending upon the particular function of the area and amount of day light available.

In the basement of the stock preparation building incandescent lighting provides an intensity of 20 foot-candles; on the operating floor and mezzanine, 30 foot-candles; and for the control rooms, fluorescent lighting also of 30 foot-candles is used.

The paper machine room high bay has mercury vapor lighting of 150 foot-candle intensity; basement and mezzanine, 20 foot-candle incandescent; and control room and below mezzanine, 30 foot-candle fluorescent.

In the finishing room operating floor, fluorescent lighting provides 50 foot-candles, and the basement is equipped with 25 foot-candles, also fluorescent.

Fluorescent lighting gives 20 foot-candles throughout the shipping building and warehouse.

Heating and ventilating

Typical of the new plant is the finishing building which is heated and ventilated by air. Through a series of systems, 100 per cent fresh air is supplied to the basement, first and second floors being drawn into the duct system through automatic filters located on the roof.

The basement system consists of three ceiling-mounted central station units, each complete with duct systems and outlets for proper distribution of air over the entire area. Heating coils and fans are built into each of the units, with provision for the future addition of cooling and humidifying equipment. Fresh air is taken in year around through a plenum duct connected with each unit. Installation provides for six changes of air per hour and a positive pressure is maintained by exhausting a lesser amount of air than is supplied.

The first and second floors are heated and ventilated by two complete systems per floor including fans, heaters, and casings. Uniform air distribution is assured through duct systems and ceiling diffusers. These systems maintain a positive air pressure and provide for eight changes of air per hour.

Heat for the shipping building and warehouse is provided by unit heaters located throughout the storage area, train shed, and truck doors. The unit heaters are equipped with thermostats with a selector base so that unit fans may be operated during "off" heat-

ing season to insure proper air circulation. Warehouse offices are heated by direct wall radiation and are provided with air conditioning units for summer operations.

The toilet and locker rooms are also heated and ventilated by air which is drawn through filters from the outside and distributed through a system of ducts and ceiling diffusers. It is exhausted through perforated grilles located in the base of the lockers and out through a top plenum which is connected with an exhaust fan. Air is supplied and exhausted in equal balance and twenty air changes per hour are provided.

SCOTT PAPER'S FORESTRY OPERATIONS*

Scott's forest management—constantly on the alert for newer and better ways of forestry operations—is developing a machine for seed planting, a seed orchard of elite trees, and new methods of site preparation.

ABOUT 1,000 cords of pulpwood must move from the forest to the mill each day to meet the pulpwood requirements of Scott's Southern Division plant at Mobile, Ala. Last year, well over 300,000 cords of pulpwood were consumed by this mill. At roughly 20 cords to the railroad car and 3¾ cords to the truckload, this means that each year a total of 8,000 rail carloads and 22,000 truckloads of pulpwood rumbles into the Mobile woodyard. During 1960 over $6,000,000 were spent for the purchase and delivery of the mill's annual pulpwood requirements.

More than 500 men, employed by independent wood suppliers and producers, earn a livelihood harvesting pulpwood for Scott's mill. Scores more scale, pay for, load, and ship the pulpwood. Numerous others are engaged in the many faceted work of tree growing on the company's 365,000 acres of Southern Division timberland in Alabama and Mississippi.

Eighty-one men and women on the staff of Scott Paper Co.'s Southern Woods Division initiate and coordinate all of these activities.

The Division is composed of two closely integrated departments—wood procurement and land management. Three staff sections—planning and research, land acquisition and conservation—support these departments.

Wood procurement

The wood procurement department obtains pulpwood through a dealer-producer system. Dealers or contractors purchase stumpage (standing trees) wherever it is available—some from company-owned and-operated lands, but the great majority from the timberlands of others. The dealer, in turn, sub-contracts the cutting of the timber to producers who with their crews fell, trim, buck and transport the pulpwood to concentration yards at rail sidings. At the strategically located concentration yards, the pulpwood is transferred from trucks to specially built rail cars for shipment to the mill. In addition to the purchases of pulpwood logs, the equivalent of approximately 58,000 cords of wood in the form of chips was purchased in 1960. The chips are produced from the residues of sawmills that operate at favorable transportation cost locations within Scott's wood procurement area. Using this wood chip supply, fewer standing trees need to be cut from the forest, thereby conserving timber for future needs.

Forest management

Although many of Scott's 365,000 acres of southern timberland are well stocked with slash, loblolly, shortleaf and longleaf pines, as well as a wide variety of southern hardwoods, considerable acreage, understocked when purchased, needs restocking.

Rehabilitating and maintaining these lands is the work of the land management department. Scott foresters concentrate on two major efforts as they grow trees:

1. The improvement of existing stands of timber through silvicultural treatment to increase forest yields.
2. The restocking of poorly stocked areas by the planting of seedlings, seeds or by natural regeneration. (Restocking by direct seeding is being tried.)

The larger portion of Scott's southern timberlands supports well-stocked stands of timber of different ages. The younger stands particularly are vulnerable to fire losses so that fire protection must be maintained. Each of Scott's seven southern forest management areas is equipped with tractor-mounted fire plows, transport trucks, and two-way radio communication systems. While the state forest services assume primary responsibility for forest fire detection and suppression, Scott foresters stand ready to direct company equipment from normal operations to fire duty should any emergency arise which the state alone could not handle.

In some areas, fungus infections attack naturally established stands of longleaf pine seedlings. Para-

*Prepared by Scott Paper Co.'s Southern Division.

doxically, under certain conditions, fire benefits longleaf pine seedlings; it sanitizes the trees and the soil. Therefore, prescribed and controlled burning is used by technically trained personnel. Burning also serves to reduce the wild fire hazard of accumulated litter and brush.

As young natural stands attain merchantable size, overcrowding occurs. The land management department then makes intermediate thinnings and improvement cuts to provide adequate growing space for the most desirable trees.

In many areas, worthless scrub hardwood trees impede the development of young pine stands. Such weed trees are eliminated by injections of herbicidal chemicals through the use of specially designed tools. Experiments are under way to control scrub hardwoods in young pine stands by spraying herbicides from the air by helicopter. A tractor-drawn "mist-blower" will be used experimentally for this purpose in the near future.

In many instances, stands nearing maturity are managed so that a new stand will be established by nature, after the final harvest of the old crop. Foresters aid natural regeneration by leaving carefully spaced seed trees at the time of cutting, or by encouraging seedling establishment before the final harvest. When natural reforestation is not feasible, trees are mechanically planted.

Practically all of Scott's tree planting program, which encompasses some 10,000 acres annually, is accomplished with tractor-drawn planting machines. A machine designed to plant seeds rather than one-year-old seedlings is being built for experimental use this year. If the experiment succeeds, it may become economically feasible to artificially reforest longleaf pine.

With increasing utilization of hardwoods—a group of species not heretofore planted on large scale in the South—experimental plantings are under way on a variety of sites to determine the yields which might be realized from selected hardwood species.

Free forest management assistance

Since the company obtains approximately 75 per cent of its wood from non-company lands, and because it is widely recognized that all southern woodlands—small as well as large—must be brought to peak production if the wood needs of the nation are to be met, Scott foresters, through their conservation program, offer free forest management assistance to private woodland owners. This program last year provided forestry guidance to more than 158 landowners on nearly 24,000 acres of timberland. Over 350,000 free tree seedlings were given to youth groups in Alabama and Mississippi in 1960. Also Scott has long participated in and supported forestry training camps for for youth groups. Three pilot forests have been developed by the company. The pilot or demonstration forest program was conceived and executed by member pulp and paper companies of the Southern Pulpwood Conservation Association to visibly demonstrate modern tree farming methods to farmers and other non-industrial woodlot owners. Ninety-two of these "see-for-yourself" forests were developed by the pulp and paper industry.

Development work

While the land management department, through its district forests, concentrates on the application of forestry techniques which will increase and stabilize the yields of quality pulp and other forest products, another group within the department, the planning and research section, engages in developmental work to find newer and better ways to increase forest productivity.

Motivated by a sense of urgency that forest productivity must continue to rise, Scott's forestry team, in co-operation with other pulp and paper companies, educational institutions, and government agencies, seeks answers to such questions as: How can we best develop superior strains of forest planting stock through applied genetics? How can land be prepared most economically, yet most effectively, for planting? Can hardwoods be profitably planted on certain sites? Which is the more efficient, the planting or seedlings or direct seeding? Major experiments by Scott foresters are in progress to find the answers best suited to their company's needs.

The seed orchard

Grafted pine seedlings are transplanted and cultivated in the company's 22-acre seed orchard. Cuttings from 30 to 40 year old slash pines having outstanding growth rates and other superior characterists are collected and grafted to the root stocks of one- to two-year old growing pines. The "parent trees", from which the cuttings were taken, are located throughout Scott's operating area. These trees were selected since their superior characteristics appear to stem from hereditary factors rather than from environmental factors. Congregated in one location, and isolated from pollen of average trees, these grafted scions will naturally cross-pollinate to produce seed with inherent superior characteristics for the seedlings of tomorrow's improved forest plantations.

The seed orchard, established in 1957, is not expected to reach full production for another 10 years, although some seed is currently being produced. This affords Scott research foresters an opportunity to make controlled cross-pollinations to test the desirable inherent characteristics of various "parent stock" combinations. It will eventually make possible the establishment of a second seed orchard of "elite" trees, trees with proven ability to pass on to their progeny their superior characteristics. The ultimate gain would be vastly improved strains of forest trees.

New methods in site preparation

Interesting results are growing out of new methods in site preparation. Several different field techniques are being used and investigations have been under way for several years to determine the relative merits of each system under different terrain and vegetative conditions. Two huge 24,000-lb. rolling choppers, pulled by crawler tractors, is one method being utilized to eliminate dense brush and to prepare the soil prior to planting. Another method—less costly under certain site conditions—employs equipment which prepares the soil and plants the seedlings in one operation. The equipment includes a tractor with a front-mounted plow combined with a conventional mechanical planter.

Since more and more hardwood pulp is being utilized in paper manufacture, foresters are trying to discover more effective methods of growing and harvesting hardwood pulping species. They are also studying forest soils to determine which tree species will thrive best on particular sites.

These and many other research programs are continuous with Scott foresters as they seek solutions which must be found if the company's wood supply is to keep pace with the demands for the products produced at Scott's Mobile mill.

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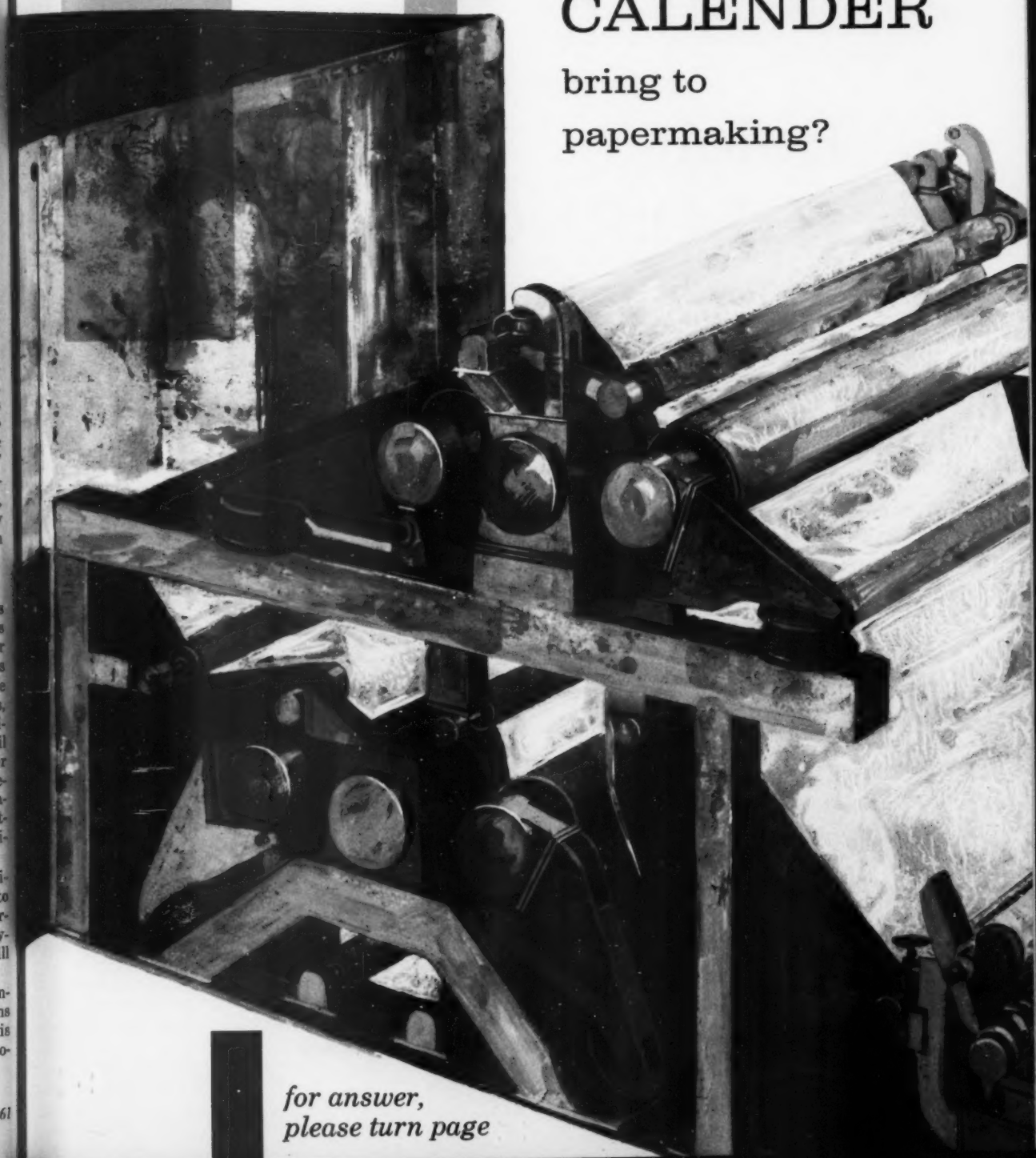

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FEATURE ARTICLES

RHEOLOGY OF PAPER COATING

R. A. DIEHM
Professor of Paper Technology
Western Michigan University

Part III—Adhesives

The functions and the effects on the rheological properties of coating mixtures by such adhesives as casein, alpha protein, animal glues, starches and latices are discussed.

THE adhesives used in paper coatings are macromolecules. The actual contacts between molecules in determining their cohesive properties may not be too numerous, but they are very strong. The larger the area of contact, the greater the cohesive bonds. Straight chain molecules exhibit very strong bonds because they can be packed closely to form a greater number of bonding areas than can the branched molecules.

With some adhesives more bonding areas are formed through branching of the molecules where one finds exceedingly strong bonds on the tips of the branches. Hence, it is possible to form strong bonds with both straight chain and branched molecules, depending upon the type of adhesive under consideration.

The bonding is chemical through polar groups which provide greater strength than the van der Waals physical forces. In the formation of these chemical bonds, polar groups such as $-OH$, $-NH_2$, and $-NH$ may act as hydrogen donors. The hydrogen acceptors may be groups as the C=O, C-O-C, and O=N-O. It is believed that adhesion is best when a ring can be formed between the hydrogen donors and the hydrogen acceptors.

It is possible to build up good adhesive properties in synthetic adhesives by the introduction of the proper groups to bond among themselves and also to bond with the paper and pigment surfaces. Sometimes this is referred to as the accumulation of adhesive bonds.

Coating adhesives need good cohesive strength to bond molecules of adhesives to one another and good adhesive strength to bond the pigment to the paper. While doing this it is the function of the adhesive to act as the carrier of the pigments to give the proper flow characteristics needed for the particular type of coating equipment used and to help regulate the ink receptivity of the coating.

The adhesive must be strong enough so that less than 40 per cent of the pigment surface is covered with it if control of the ink receptivity is to be regulated. If considerably more of the pigment surface is covered, the effects of the pigment, as such, fail to manifest themselves. In fact, the pigments are spot welded to themselves and to the surface of the paper. When 14 per cent of casein is used on the pigment, about 30 per cent of the pigment is covered by the adhesive.

The water retention properties of the coating mixture are regulated by the adhesive. It determines the rate at which water leaves the coating solids. The flow characteristics of the coating mixture change less on the coating equipment when the water retention is high than when it is low. In many cases, adhesives with high water retention will produce coatings with less patterns than will those with low water retention. On the other hand, coating puddles may form if the water retention is too high so that the paper cannot take sufficient water from the coating mixture. With few exceptions, the higher the viscosity of the adhesive, the higher will be the water retention. The addition of other substances, particularly humectants, will increase the water retention capacities of most adhesives.

Casein

There are many references in the early literature on papermaking to the use of different animal proteins for various purposes. It might be expected, therefore, that these adhesives were used in the early stages in the development of paper coatings. Of these, casein enjoyed wide application.

Casein is an amphoteric substance which explains its many types of behavior under different pH conditions. Its molecular size is usually considered to be 1000 by 7 Angstrom units. Since it is not soluble in water, but must be converted into alkaline salts prior to its use in the coating mixture, various rheological properties can be established

by the kind and amount of alkali used in dissolving it.

Casein is precipitated in its preparation from milk by rennet or acid precipitation. Neither of these methods exerts any appreciable influence upon the casein molecule and, in general, the rheological properties of the precipitated products do not show too much difference.

The high viscosity and gelation of casein at high solids has posed a number of rheological problems in its use in coating mixtures where high solids are required. The viscosity decreases as the temperature of the casein solution is increased. Various methods have been used to dissolve casein in such a manner as to obtain higher solids solutions. Sodium hydroxide, sodium carbonate, ammonium hydroxide, borax, and quaternary bases have been used singly and in combination.

The stronger alkalis normally give the lowest viscosity casein solutions, but only at the expense of damage to the casein molecule. Since practical experience has shown that casein solutions at pH 9 give the lowest viscosity with the least loss in adhesive strength, the above alkalis are used in amounts to provide solutions in that range.

Casein solutions are pseudoplastic in character. The strong alkalis push them in the direction of Newtonian flow, while the weaker alkalis impart properties approaching plasticity.

A search for a method for reducing the viscosity of casein with a minimum of adhesive loss brought about some work on the use of proteolytic enzymes to perform a hydrolysis mild enough to do the job. The viscosity is lowered considerably in the early stages of hydrolysis, but not without losing some adhesive strength. Proteolytic enzymes from different sources affect this relationship in various manners. When the specificity of enzymes is considered, it is not unlikely that there exists somewhere in nature a proteolytic enzyme that could aid in this problem.

Additives have been used in casein solutions not only to decrease the viscosity and modify the flow characteristics, but also to stabilize the solutions. The establishment of satisfactory equilibrium conditions in protein adhesives has been problematic in many cases, to say the least.

Sodium sesquisilicate added to casein solutions gives all the viscosity reductions sought, but it raises the pH high enough so that the stability of the solution is very poor. Adhesive quality suffers when this occurs. Urea in casein solutions will give stable solutions, but does not drop the viscosity sufficiently to permit the preparation of the high solids coating mixture.

The addition of latex to casein solutions has solved some of the problems in making higher solids formulations. While the casein solution itself shows pseudoplastic flow, the addition of a small amount of latex will cause the system to show thixotropic-plastic flow. The two materials work good together because the casein is a protective colloid used in many dispersions. The combination has high solids and low viscosity.

Alpha protein

The alpha protein extracted from soya beans shows many similarities to casein when used in paper coatings. Critical control is exercised in its preparation with the result that products of various viscosities have been made. Since the final pH values of alpha protein are higher than are those of casein solutions, one can expect somewhat lower viscosities. The adhesive strengths of the two are about the same. Coating mixtures containing alpha protein are more thixotropic than are those containing casein. They increase the viscosity of the coating mixtures less than does casein.

Both casein and alpha protein coating mixtures are treated with formaldehyde, alum, etc., to produce a certain amount of water resistance to the coating film. The amount and type of alkali used in cutting the protein as well as the amount of insolubilizing agent added to the mixture have a pronounced effect upon the rheological properties. When this reaction is carried too far, gelation occurs. Practically, the amounts used give flow characteristics somewhere between the original flows and the gelation points.

Animal glues

Gelatin was the first adhesive used in the coating of paper, but its use today is confined to playing cards, wall papers, and specialty coatings. Its common name in the coating industry is animal glue. It is extracted from hides and bones. It is used in highly purified form as an adhesive in the coating of photographic papers.

The formation of gels with glue has been studied quite extensively since it is through the control of gelation that they found specific uses in the industry. Solution is effected in water by heating after a preliminary soaking period in which solution becomes complete at the melting temperature of the glue. It is a negatively charged, amphoteric colloid which, together with its water solubility, permits wide control of its flow properties. The rigidity of the gels formed by various glues at definite concentrations is a measure of their commercial value, those forming the most rigid gels having the highest adhesive strengths.

Time and temperature are very influential in determining the rigidity of the gels formed by glue. When the solution gels, it does not immediately r e a c h equilibrium in rigidity even though the temperature is constant. It might require considerable time to reach an apparent equilibrium, but it has been reported that the rigidity never reaches a constant value. The modulus of rigidity is so variable that true comparisons of glue gels can be made only in the same r a n g e s of ageing temperatures. Under careful observations, it has been found that the rigidity of the glue gel is proportional to the square of the glue concentration.

The rigidity of the glue gel is little influenced by pH in the range of 4 to 9 in dilute solutions. The paper coater has a wide choice of materials to use in the coating mixture without disturbing the basic character of the glue when the glue is in dilute solutions. At higher glue solutions, the rigidities of the gels were highest in the pH range of 6 to 10, but dropped off considerably below 6 and above 10. Maximum rigidity was noted at pH 9.

When glue is freed of the inorganic substances present in commercial grades, the rigidity of the gels increases. Electrolytes added to the system containing glue will decrease both the rigidity of the gel and the elasticity.

Nonelectrolytes such as ethyl alcohol will increase the rigidity of the gel up to a certain point, and if this point is exceeded, a gel of a very coarse structure is formed. The addition of sugar or glycerin also increase the modulus of elasticity of the gel. The addition of formaldehyde increases the elasticity very markedly through a reaction which becomes irreversible when a certain concentration is reached. The molecular weight of the gelatin molecule determines the extent to which both electrolytes and nonelectrolytes influence the above reactions.

The boundary between the glue solution and the glue gel is not

definite, but is an area where the glue system exhibits properties determined by its thermal and mechanical treatments. Rapid cooling can allow solutions to exist below the gelation temperature even if only for a short time. Thus the time element must always be considered when handling glue solutions under changing environmental conditions. The viscosity increases gradually as the solution is cooled with no discontinuity at the gelation point. The viscosity of the glue solutions in the area where gel formation takes place changes with time and shows a certain dependence upon the rate of shear applied to the system. Flow properties of concentrated solutions at or near the gel point must be classified as anomalous.

Starches

Starch is widely used as an adhesive in the paper coating field, the three chief sources being corn, tapioca, and potato. Starch is made up of amylose and amylopectin. The rheological differences of the different starches are determined largely by the ratio of these components to each other. If this is the case, then each one should contribute definite characteristics to the starch solution.

Retrogradation or gelation is a property exhibited by almost all starches. The raw starches retrograde more than do the converted starches. It is believed that the amylose is responsible for retrogradation because of the rapid association of these molecules in the starch solution. Solutions of amylose over 5 per cent will gel upon cooling. Their viscosity is high and they exhibit thixotropic flow.

The amylopectin solutions, on the other hand, are stable, have low viscosity, and do not retrograde. High solids solutions will show viscosity increases as they cool, but they do not form irreversible gels. There is no reaction between amylopectin and soap as there is between amylose and soap.

The viscosity of natural starch solutions is too high to give the mobility needed in the coating plant. Therefore, starches are modified by oxidation, dextrination, enzyme conversion, or made into derivatives by hydroxyethylation or acetylation to alter the intercrystalline glucose chains to reduce both the viscosity and the retrogradation of the solution. Adhesive strength is lost by modification to reduce the viscosity, but the adhesive properties remaining can be used to advantage because of the better mobility of the starch solutions.

If the modification is a hydrolytic procedure, the amylose loses adhesive strength, its clay suspending power, and its ability to form water resistant coatings faster in relation to viscosity reduction than does the amylopectin. This may be because the amylose has a lower molecular weight than does the amylopectin and the sugars are formed more rapidly from the lower molecular weight material.

It is not easy to make accurate viscosity determinations of starch solutions as is evidenced by the fact that the corn starch industries have developed a special viscometer to obtain such data. Viscosity determinations in the coating plant are made with both gravity flow and rotational viscometers.

The stability of the starch solution viscosity is of extreme importance as it is exposed to shear or high speed agitation in the coating mill. Unless it remains stable under such conditions, the coater operator will find it very difficult to apply coatings of uniform weights and film characteristics.

Starch solutions have not been completely stabilized although the rate of viscosity breakdown has been slowed considerably. It is believed by some that this thinning is the result of the fragmentation of swollen starch granules under high shear. The larger granule starches appear to break down the most rapidly. Corn starch solutions have been stabilized considerably by the introduction of phosphate cross-bonds.

The clarity of the starch solution is related to the retrogradation tendency of the starch. It is influenced by the manner of cooking, the concentration, the pH of the solution, and the presence of a number of substances that alter the flow characteristics of the solution. The farther one moves away from the natural starch, the less opacity of solution and less retrogradation will be encountered.

Starches with the amylose fraction removed, form clear solutions which do not retrograde. Such starches have been prepared by selection of the proper cereal grains as their sources. It is reported that such starches show remarkable viscosity stability during cooking and cooling, superior water holding capacity, and form smooth continuous films. As one would expect, such a natural product will have its variations, and all these properties might not always be realized. These starches are modified readily.

Because of the importance of viscosity stability in the coating mixture, the oxidized starches have found wide use while the acid modified starches have not been satisfactory. This is because the acid modified starches retain the gelling properties of pearl starch after treatment.

Surfactants have been employed to clarify starch solutions with variable results. Polyoxyethylene monostearate increases the opacity of the solution, probably by the formation of an insoluble complex with the amylose. Some of the nonpolar surfactants did not cause any change in the clarity of starch solutions. Sodium lauryl sulfate and dimethyl octadecyl ammonium chloride greatly increased the clarity of the solutions.

Various starches show differences in the bonding between molecules during film formation. Rapidly dried films are more water soluble than are slowly dried films, probably because the rapid drying does not give sufficient time for the proper association of the molecules with each other. Proper film formation has long been recognized as of extreme importance in coating adhesives, and considerable work is being done on this problem.

A number of additives have been recommended for use with starch solutions to reduce the viscosity and to modify the flow characteristics. Their effects have been given the general term of fluidifying agents. They may or may not reduce the strength of the starch. Such products, together with latex additives, have given the paper coater a wide control over starch adhesive properties.

Latices

The use of polymers in latex form as coating adhesives has expanded rapidly during the last decade. These materials are often called polymer emulsions, latices, and polymer dispersions. The solid materials consist of butadiene, isoprene, chloroprene, acrylate, methacrylate, methacrylate esters, vinyl esters, vinyl chloride, acrylonitrile, styrene, etc.

The viscosity of such products must be low enough to permit easy handling and to permit a certain amount of flow on the coating equipment, and yet there must be sufficient viscosity to prevent the settling of pigments suspended in them. Therefore, it seems that these products must be adjusted to a rather narrow range in viscosity if they are to be used in the coating

(Continued on page 873)

RIEGEL PAPER COMPANY OPERATES AN R-100 CUTTER-LAYBOY UNIT

A. W. J. DYCK

The R-100 delivers clean-cut sheets of such narrow tolerances that, for many shipments, no further trimming is required.

A NUMBER of important and decisive factors usually influence the selection and procurement of equipment so as to meet the paper mill's specific requirements.

It was after a thorough consideration of such factors that Riegel Paper's Carolina Division decided on the installation of a Moore & White R-100 cutter-layboy in its Acme mill. Riegel's requirements were: (1) clean-cut sheets within narrow tolerances; (2) direct shipment from the layboy; and (3) high productivity with a minimum of downtime.

One of the most important advantages of the R-100 is its high speed which permits economical operation, even when cutting a single sheet of paper. Single-sheet runs, which are preferred by Riegel, make for ideal conditions of clean and precision-length cutting of sheets, so that no further trimming operation is required.

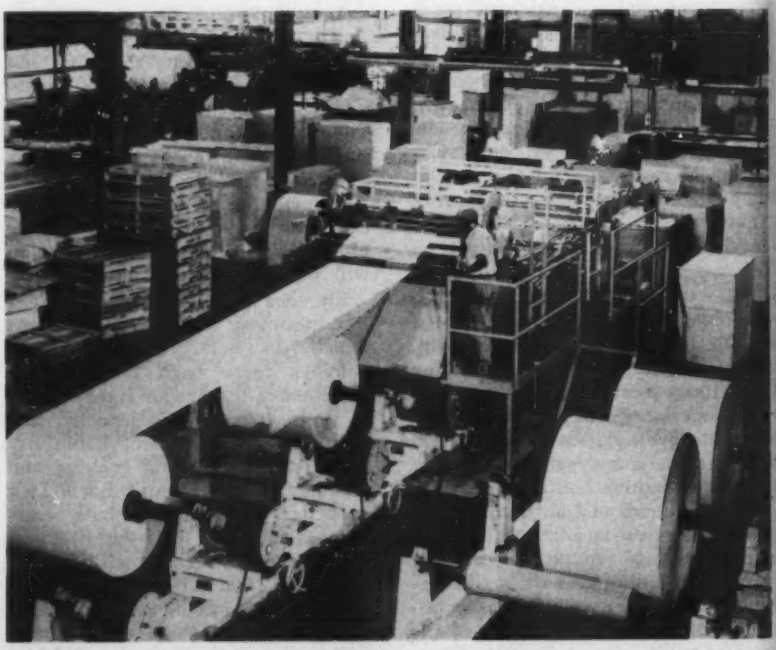
As checked by tachometer, the R-100 operates at a speed of 850 fpm. However, the machine has been run at speeds as high as 1000 fpm. Output capacity has reached 100 tons per day when cutting a double sheet.

While it is more profitable for a paper mill to ship paper in the form of rolls, Riegel's customer requirements are such that a high percentage of the mill's output has to be converted into sheets. The fact that the R-100 delivers clean-cut sheets of such narrow tolerances that, for many shipments, no further trimming is required, will be of considerable interest to the paper industry, in general.

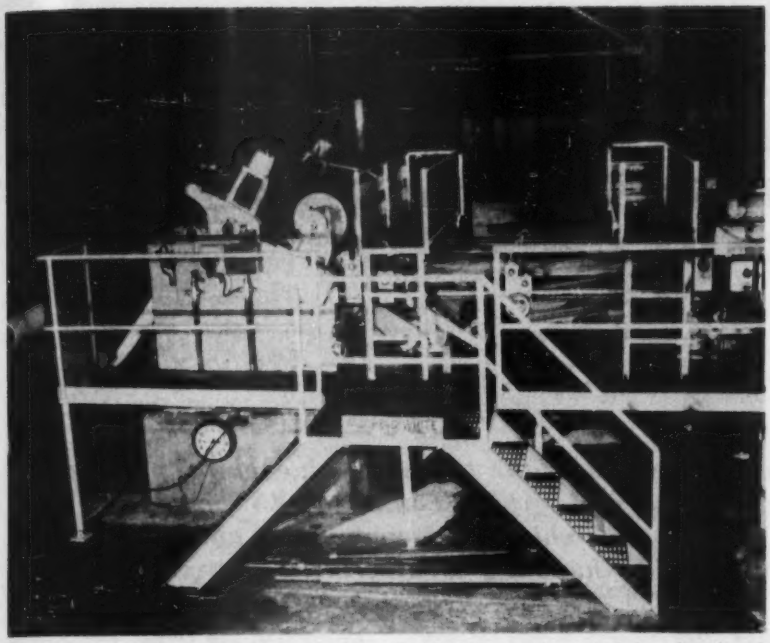
Description of the R-100 cutter-layboy

The cutter-layboy, designed to keep maintenance at a minimum and speeds at a maximum, consists basically of (1) a shuttle backstand, (2) the cutter, and (3) the layboy proper with automatic side removal feature.

The shuttle-type backstand features twin backstands which are



The shuttle-type backstand features twin backstands, mounted on a motor-operated carriage.



The cutter, driven by a 15-hp drive, is equipped with P.I.V. unit to control sheet length with a high degree of accuracy.

mounted on a motor-operated carriage, so that one backstand can be loaded with a set of paper rolls while the other feeds the cutter. This completely eliminates downtime normally spent on loading.

Accurate alignment of rolls on the backstand is facilitated by a special bearing design which permits crosswise and endwise adjustment. Sheet tension can be individually controlled by the operator by means of air-cooled, air-regulated brakes.

Cutter frames are of heavy duty construction and all rolls and vital moving parts are balanced and mounted in anti-friction bearings to insure vibrationless, smooth, and efficient operation. The cutter is driven by a 15 hp variable speed drive located within the machine frames.

A P.I.V. unit is used to control sheet-length range which can be maintained within a high degree of accuracy. A handwheel with dial indicator permits range-changes to be made quickly and accurately.

The revolving knife assembly is held securely in a heavy cast iron housing and is mounted as a unit, together with the bed knife, on a slope to permit the sheeted paper to be transferred into the conveying tapes with a minimum drop from the point of shear. The revolving knife drive is equipped with "Torque Limitor" which permits the coupling to slip in case of overload and ball-up to prevent damage to the drive. All bed-knife adjustments are made by means of set screws and draw bolts.

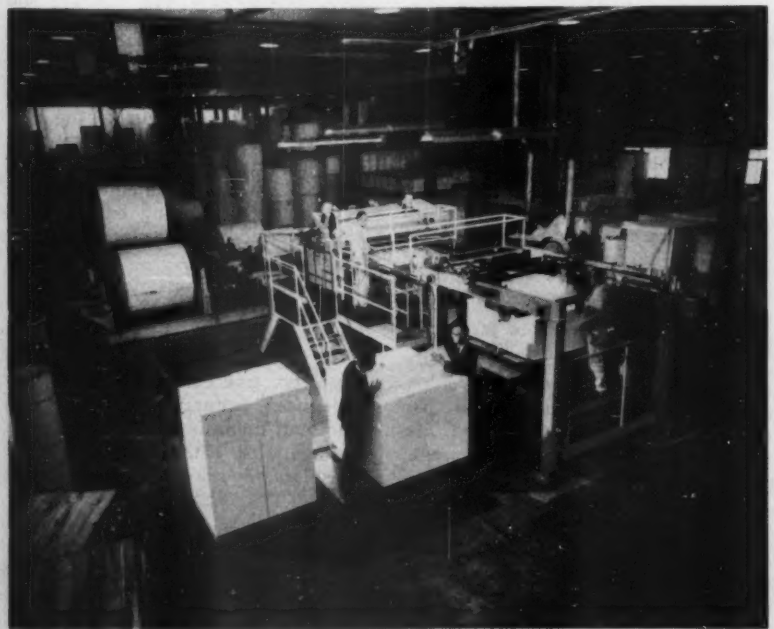
The cutter is further equipped with a decurl-roll consisting of a small diameter roll which removes curl by reverse bending of the sheet around this roll.

The rubber covered draw roll is air-loaded for uniform control of nip pressure. A finger roll at the nip of the draw roll is provided for the operator's safety.

In addition to maintaining sheet length accuracy and providing clean-cut sheets, the machine design is of such precision that it contributes to unusually long life of the tapes. According to Ralph L. Ellis, Jr., Staff Engineer, all of the tapes that came originally with the machine are still in operation on the R-100 cutter-layboy.

Automatic side delivery of skids permits direct shipment from the layboy, which is a compact unit engineered to pile sheets of paper with maximum accuracy. Sheet travel into the layboy is controlled by adjustable top tapes and bottom roller fingers, while precision piling of sheets is assured by side and end joggers. The joggers are driven by independent variable speed motors which control the jogging motion and length of joggers stroke.

When the pile is complete, it is automatically lowered on a platform and discharged to either side of the layboy. In the meantime, a second platform and a new skid automatically enters the layboy from the loading side and is quickly raised into the desired position by two-speed electric gearhead motors. This eliminates the conventional downtime associated with the removal of the finished pile and skid.



The layboy features joggers, which insure precise piling of sheets, and automatic lowering and side delivery of skids.

INTEGRATION OF PURCHASED AND MANUFACTURED HARDWOOD AND SOFTWOOD CHIPS*

WAYNE ROBINSON
Pulp Mill Superintendent
East Texas Pulp & Paper Co.

Eastex receives 2500 cords of pine chips per week from six saw mills which comprises 45 per cent of the total chip requirement. An effective system of chip handling is described.

EVEN before the first digester was blown at the East Texas Pulp and Paper Co. mill at Evandale, Texas, in late 1954, arrangement had been completed to receive approximately 1600 cords of pine chips per week from the large new Kirby Lumber Company mill in nearby Silsbee, Texas. Kirby is a large 300,000 bd. ft./day mill and is equipped with a hydraulic barker, two chippers, one 8-knife and one 6-knife, and three chip screens. Twenty eight storage bins holding about ten cords each were built by Eastex at the Kirby mill.

Chips supplied by six sawmills

By the end of 1957, six small saw mills, with the help of Eastex, were in the chip business with a combined total production about equal to that of Kirby. It is interesting to note that not one of these small mills initiated its own chip production program. This is no reflection on the owners of these mills. They knew and understood the lumber business but pulp chips were new to them. Eastex not only had to convince each one of them that it would be a paying proposition, but also lent substantial financial, engineering, and mechanical help in getting each of them started.

Each mill was advised that if its lumber production were as much as 20,000 bd. ft./day, there should be no doubt about the profit picture in saw mill chip production. In most cases, Eastex advanced the saw mill enough money to purchase the barking, chipping, and screening equipment; and actually took care of the details of requisitioning the equipment. Each mill was shown that it would enjoy a four-year payout on its chip production equipment. Because of the similarity in size of all these mills the same equipment was recommended and purchased for each of them. The barker is a 26-inch Cambio and can easily take care of a mill producing 50,000 bd. ft. of lumber in an eight-hour day. The screen is a model CS-35 (750° -35A) and can screen ten cords chips per hour. The chipper is a model 710-60A with a capacity of 2100 cu. ft. of chips per hour, or ten cords per hour.

At present, Eastex receives 2500 cords of pine chips per week from the six saw mills. The nearest of these is ten miles from the pulp mill and the most distant is 79 miles away. No hardwood chips are being received at present, although we have during certain periods in the past received as much as 800 cords of hardwood chips per week.

This quantity of saw mill chips, comprising approximately 45 per cent of our total chip demand, are received only five days a week. Thus our woodyard must operate on a rather irregular schedule. Actually we have two operating crews that work 40 hours per week each. On Saturday, Sunday, and Monday we operate two eight-hour shifts per day and Tuesday, Wednesday, Thursday, and Friday only one shift per day.

Unloading the chips

All chips are transported to our mill in open top vans drawn by truck tractors, each holding about ten cords of chips.

Unloading is accomplished by lifting the tow-end of the van with a 15-hp electric hoist which allows the chips to flow out the back of the van into a hopper. The hoist is mounted 35 ft in the air. The vans are hoisted to about a 45° angle.

No additional personnel is required for chip unloading. The truck driver backs his van into position, disconnects the tractor, and operates the hoist. An electric eye starts the blower motor automatically when the van is backed into position. Woodyard personnel stop and start the conveyor to the belt, and see that chips go to proper silos as a part of their operating duties. For the 11-7 shift, the conveyors are set so that unloading can be continued with no Eastex woodyard personnel on duty.

To move the chips out of the hopper, we have two chain conveyors, one carrying chips to the blower via a 16 ft. by 14 ft. chip charger, and the other one carrying them to the belt used primarily for conveying our own manufactured chips to the storage silos. Either one or both of these conveyors can be operated at a time.

The blower is a rotary positive blower driven by a 150 hp, 1185rpm motor. With the use of the blower alone, about 20 minutes is required for a ten-cord van to be unloaded. If both the belt and the blower are used, this time is cut in half.

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* Abridged from a paper presented at the PIMA meeting held at Williamsburg, Va., October 12-14, 1960.

Storage of chips

All of our chips, purchased and manufactured, are stored in three silos prior to introduction into the digesters. Each of these holds 250 cords of chips. They are located approximately 50 yards from the woodroom and the chip blower, and are 70 ft high. No. 1 silo is usually used for hardwood chips, while Nos. 2 and 3 are used for pine. Chips can be blown into No. 2 and No. 3 and run from the belt into all three silos. Initially we had a rather serious problem of blown chips hanging up in the silos. The line from the blower entered the silos on one side and seemed to pack the chips up on that side in a tight pile. The problem was finally solved about a year ago when we installed a cyclone above the silos through which the blown chips passed before entering the silos. From the cyclone, chips fall freely into the center of the silo, thus completely eliminating the hangups. Saw mill chips and manufactured chips are mixed on the conveyor belt and in the silos indiscriminately. We have experienced absolutely no pulp quality problems due to mixing the two, nor have we had any problems of non-uniformity in our pulp due to using a preponderance of saw mill chips one day and mostly manufactured chips the next, as is often the case in our mill.

Rigid chip standards

Early in this program we set rather rigid standards that had to be met by saw mills supplying us with chips. This has proved to be good for all concerned. We require that the bark content be below 0.1 per cent, the oversize chips not exceed 7.2 per cent, and the fines be 0.50 per cent or less. To insure that the quality of our saw mill chips meet these high standards, we had our most experienced woodyard operator visit each of the mills periodically. Since he had had wide maintenance experience with woodyard equipment as well as operating experience he was able to give invaluable assistance in the operation, adjustment and maintenance of their barking and chipping equipment.

ADHESIVES

Continued from page 869

mill without special precautions in their formulation into a coating mixture.

While the viscosity of a polymer solution rises rapidly as the molecular weight increases, the viscosity of the polymer dispersion is ordinarily independent of the molecular weight of the dispersed phase. This permits the use of the stronger polymers in coating formulations without the troublesome high viscosity.

On the contrary, the rheological problems with latices lie in the fact that their viscosity is too low. Consequently, combinations of the thin dispersion and the thick water soluble polymer solutions are made to bring the viscosity of the combination within the required range. Both synthetic and natural water soluble high molecular weight polymers are used.

Anionic and non-ionic materials are used almost exclusively when synthetics are employed. Proteins are used in some cases, but care must be exercised in their use because of the amphoteric nature of these molecules. When using such materials, one must be careful to maintain the proper pH to avoid precipitation of the latex solids by oppositely charged ions.

In making the combination of the thickener and the latex, the former will be in high concentration and high viscosity until the blend become homogeneous. If the thickeners are polyelectrolytes, they might cause coagulation of the latex solids. In addition, some high molecular weight polymers are good flocculating agents, and this effect must be avoided or controlled while blending the ingredients of the coating mixture.

The problems are so great when dispersions and solutions are mixed that the effects of the various components upon one another should be understood clearly before large scale mixing is attempted. The lower molecular weight polyelectrolytes may serve as dispersing agents, causing the dispersions to become lower in viscosity. High molecular weight polymers may act as creaming agents, speeding the separation of the continuous and dispersed phases; in other cases, they may thicken the latex appreciably, preventing the separation of the phases.

The materials used most commonly in the flow modification of latices are methyl cellulose, hydroxyethyl cellulose, sodium carboxymethylcellulose, casein, soya protein, styrene maleic anhydride copolymers, polyacrylates, and alginates. Since much of the compounding is done by the latex manufacturer, it would be difficult to add further information of any value.

There is no one adhesive that has all the desirable properties for all coating jobs. Their strength properties and rheological characteristics differ widely. The function of the adhesive is so demanding that it must be capable of various degrees of modification to do each particular job. If the economics of the adhesives are added to these considerations, the choice is usually not difficult to make unless very unusual properties are sought.

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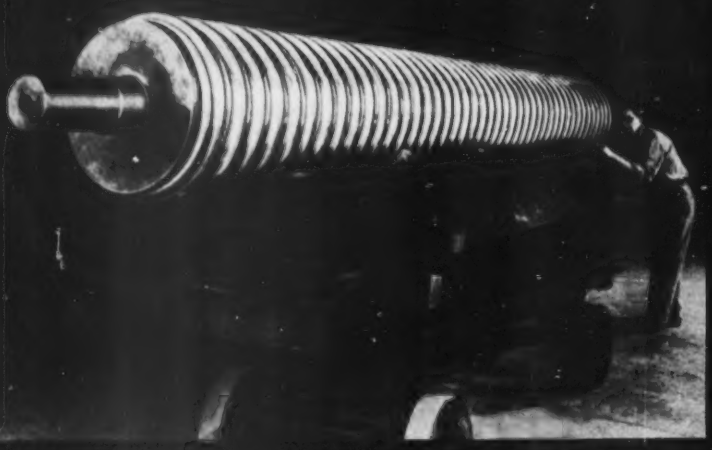
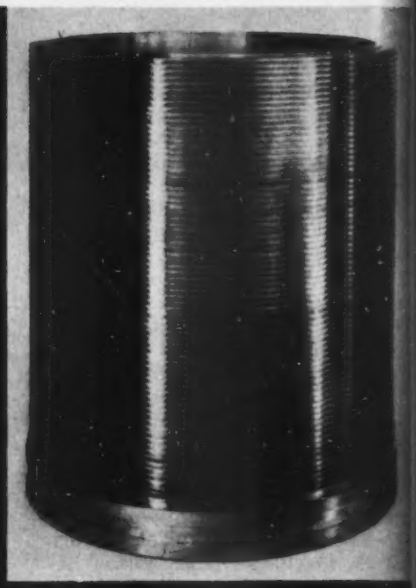
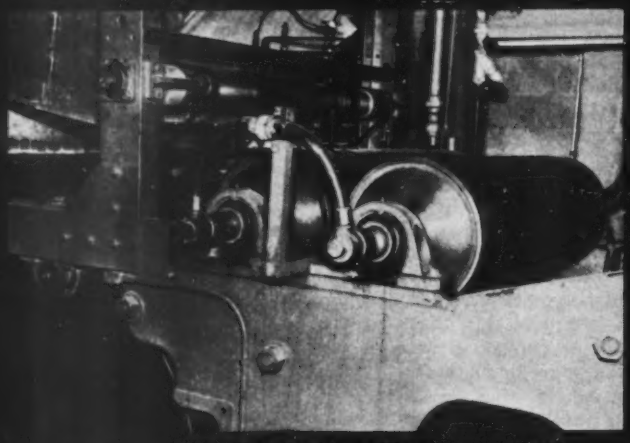


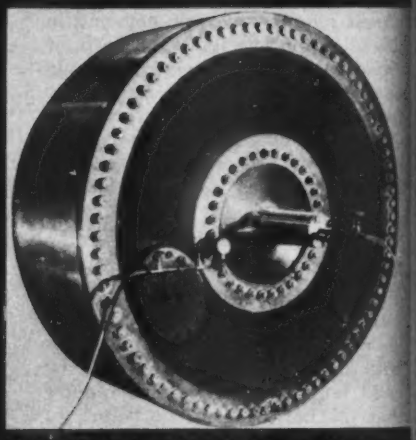
Centrifugally cast, finish machined roll, 12" long x 24" diam. Forged steel heads shrunk into place without cracking.



Centrifugally cast, finish machined sleeves, 20¼" O.D. Thickness of fin .035", height of fin .875". Weight, 289 lbs.



These two Ampco Cooling rolls replaced four cast-iron rolls — needed no chrome plating. Cleaning and maintenance practically nil.



Pilot model Yankee drier, 8' diam. x 24" face. Body is Ampco 8 plate. Heads, Ampco 18 sand castings. Trunnions, forged Ampco 15.

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1961

Warren B. Bullock

Final report on 1960 production — Newspaper publishers file objection

Figures on production

Final figures for 1960 show that the increase in production was only .9 per cent, instead of the anticipated 1.5 per cent. Total output was 34,300,000 tons. Sales of paper during the year are officially estimated at $12,650,000,000 a gain of half a billion over the year before. The profit squeeze is similarly shown by a decline in earnings to $590,000,000 as compared with $619,000,000 in 1959.

Weyerhaeuser — Hamilton

The expansion of the great Weyerhaeuser Timber empire into the paper-producing field has been marked by another acquisition of an important paper company — the Hamilton Paper Co. of Miquon, Pa. It was at a comparatively recent date that Weyerhaeuser interests acquired a block of paperboard and shipping container companies. The Hamilton purchase, yet to be approved by Hamilton stockholders, brings the great Pacific Coast organization into the eastern fine paper field.

The proposal would give holders of 379,594 shares of Hamilton stock nine-tenths of a share each of Weyerhaeuser stock. The purchase marked a major innovation in Weyerhaeuser operations, originally lumber, then pulp, and now into both coarse and fine papers and paperboards.

Kennebec — Scott

Kennebec River Pulp & Paper Co. has been given an option to buy the Scott Paper Co's. groundwood pulp mill at Madison, Me. The Madison mill became part of the Scott organization when Hollingsworth & Whitney was merged into Scott. The Scott officials, however, deny that the proposed sale of the Maine plant has any relationship to the demand by the Federal Trade Commission — that Scott divest itself of Hollingsworth & Whitney and other similar divisions.

Newspaper publishers file objection on tariff act

The American Newspaper Publishers Association has filed formal objection to the proposed simplification of the United States Tariff Act under which the United States Tariff Commission has suggested that the definition of standard newsprint be incorporated into the basic act. The newspaper publishers say that the current definition — which for many years has been a guide under which United States customs officials have admitted newsprint as a duty-free commodity — under this proposal would be frozen into the act itself. Since the definition was originally written it has been amended from time to time to allow changes to conform to technical advances in paper manufacture.

NPTA changes program

The National Paper Trade Association is considering a radical change in its convention program, including a move for its New York and Chicago annual meetings. Under the proposal, a September convention and exhibit will be alternated year by year between the Conrad Hilton Hotel in Chicago and the new Americana Hotel in New York, now under construction. If the new program goes into effect the usual formal annual convention previously held in the spring at the Waldorf Astoria, New York, will be held in various cities on the West Coast, South, Southwest and Southeast. The new program, if decided upon, will be effective in 1963.

Tariff sessions

Because of uncertainties in developments in the European Economic Community, the tariff bargaining sessions scheduled to have begun in January have been deferred to March. Many GATT members feel that the concession offered by the Customs Union are insufficient.

A decision by the United States Court of Customs and Patent Appeals has resulted in the classification of certain imported creped paper at the duty-rate for paper cut into shape. The shipment involved was composed of jumbo rolls, 10 in. in width and 16,000 ft. in length. It was originally assessed for duty by Customs officials at the higher rate for creped paper.

Tappi To Study Synthetic Materials Role

The Converting and Consuming Division of TAPPI has announced two changes concerning this division.

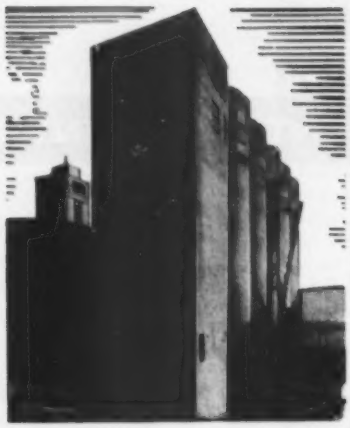
A recent establishment of a Synthetic Fibers Committee was the first significant change. Dr. R.A.A. Hentschell (E. I. du Pont de Nemours & Co., Inc.) will be Committee chairman.

The second change is the formation of a Staff Advisory Committee. This committee was formed for the purpose of providing staff guidance to the various committees of the division. These committees include: the new Synthetic Fibers; Plastics; Plastics Laminate; and the Wet Strength and Interfiber Bonding Committees.

Dr. J. C. Pullman (American Cyanamid Co.), general chairman of the converting and consuming Division of TAPPI, announced that these steps were considered most desirable in view of the rapidly changing conditions in the paper converting and consuming industries.

Newsprint Committee starts research project

The Newsprint Information Committee, composed of a group of leading Canadian newsprint manufac-



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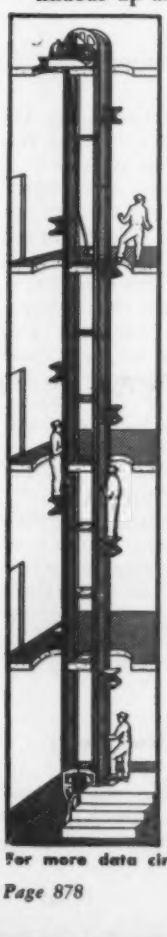

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turers, has decided to underwrite a research project to determine the impact of advertising upon newspapers as an advertising medium.

Production abroad

The growing demand for paper by world consumers is demonstrated by recent developments in the Orient. During 1960, Japan produced 19 per cent more paper than in 1959. 1961 production is expected to be nearly as great an increase over last year.

The Export-Import Bank has authorized a loan of $18,500,000 to the Orient Paper Mills Ltd. of Calcutta, India, the loan to be used for the purchase of paper-making machinery in the United States. The loan is to be repayable over a period of ten years.

Meanwhile in Russia the Soviet Government has been forced to limit the circulation of books and newspapers because of a Russian lag in production growth as compared with the United States. However, it is claimed that a new type of germ-proof paper has been developed for the packaging of agricultural products.

Net incomes

Crown Zellerbach Corp. — Despite an unsatisfactory fourth quarter, net income for 1960 was $40,070,000 as compared with $39,329,000 in 1959.

Sealright-Oswego Falls Corp. — 1960 net income, $1,496,000; a year ago, $2,172,000.

St. Regis Paper Co. — Profits for 1960 dropped to $21,657,517 from the 1959 figure of $30,967,898, despite an increase in sales to $536,199,354 from the 1959 sales of $505,672,277.

United Board & Carton Corp. — Income for 24 weeks ended November 24, $85,208; a year ago, $186,144.

Rayonier Inc. — Net income for 1960, $9,500,000 a year ago, $13,335,000.

KVP Sutherland Paper Co. — For quarter ended December 31, $1,129,969; a year ago, $983,715.

Scott Paper Co. — 1960 was marked as record breaking in sales and profits. Net income was $27,729,943; a year ago, $24,795,070. An increase of over 11 per per cent. Sales increased 5.4 per cent totaling $313,276,344 as against $297,159,550 in 1959.

Champion Paper & Fibre Co. — Income for the December quarter was $1,062,944; a year ago, $2,396,079. Nine-month income netted $4,663,348; a year ago, $6,688,388.

Great Northern Paper Co. — For 1960, $3,113,000: a year ago, $1,848,000.

Container Corp. — 1960 income fell to $17,078,427 from the 1959 figure of $19,638,780. Sales climbed to $327,262,000, a new record from the 1959 volume of $322,286,816.

Mead Corp. — Net income for 1960, $13,700,000 as compared with $14,000,000 the previous year, although sales totaled a higher figure.

S. D. Warren Co. — 1960 net income, $5,258,429; a year ago, $4,978,221.

Union Bag-Camp Co. — 1960 net income was slightly below that of 1959, being $18,600,000 as compared with $19,706,022 for the previous year. Sales however, hit a record $213,000,000 as compared with slightly less than $204,000,000 a year ago.

Financial notes

Some sharp advances in quotations for paper mill issues over the prices early in January were decidedly selective. Some issues advanced sharply on the news of improved outlook for particular companies, while others failed to share in the general market advances of the month.

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	February 10, 1961	January 10, 1961
American Can	35¼	36⅛
Same Pref.	37⅞	32⅜
Celotex	28½	25¾
Same Pref.	17½	17
Certain-Teed	32½	25¾
Champion P & F Co.	28⅜	29
Same Pref.	92½	91
Chesapeake of Va.	34	34¼
Container	27⅛	24⅜
Same Pref.	* 93½-96	91
Continental Can	38⅜	37⅝
Same Pref.	85	77½
Crown Zellerbach	54	55⅛
Same Pref.	91½	* 90⅝-90¾
Diamond National	40¾	36½
Same Pref.	* 31-31⅜	30
Federal Papeboard	36	35
Same Pref.	* 23-23¾	* 22½-23½
Fibre Paper Board	29¼	29⅛
Great Northern	55	52
Hammermill	29½-	27½
International	34	33½
Same Pref.	* 93⅜-94¼	* 94¼-95¼
Kimberly-Clark	92⅜	83½
KVP Sutherland	34¼	31½
McAndrews & Forbes	29¾	27¾
Masonite	32¼	32
Mead Corp.	39⅜	37⅛
Same Pref.	* 89½-91	* 88-89⅜
Minn. & Ontario	31½	31½
Nat. Vulc. Fib.	21½	21¾
Oxford Paper	32	27¾
Same Pref.	91⅛-	* 89-90½
Rayonier	19⅜	17¾
Riegel Paper	* 28-28½	28⅛
St. Regis	38⅛	36½
Same Pref.	* 91-94	* 92-93
Scott Paper	94½	87¼
Same $4 Pref.	91	* 88-90
Same $3.40 Pref.	* 75-76½	74½
Sealright	35½	33⅛
Standard Packaging	24⅜	23¼
Same $1.60 Pref.	72	* 68-68¼
Same $1.20 Pref.	28	29⅛
Same 6% Pref.	28¾	29¼
Union Bag-Camp	37⅜	35¼
Union Bd. & Cart.	19⅜	22½
U.S. Gypsum	106⅛	102
Same Pref.	154½	*153-155¼
West Va. P. & P.	38¾	41¼
Same Pref.	* 95½-97	* 94-97

New York Stock Exchange — Bonds

	February 10, 1961	January 10, 1961
Champion P&F Co. 4½%	109	110
Champion P&F Co. 3¾%	96	93
Diamond Gardner 4%	92	92
Kimberly-Clark 3¾%	94½	92½
Oxford 4¾%	111	108
Scott 3%	128	112

American Stock Exchange — Stocks

Allied Paper	11½	11¼
American Writing	31⅞	29⅛
Brown Co.	13⅛	14
Puget Sound	24	21¾

*Closing Bid and Asked Prices

On page 733 of our January issue, it was erroneously stated that Dr. Louis T. Stevenson retired under the age limit retirement program of the APPA. Correction: Dr. Stevenson left the Association voluntarily and was not subject to any retirement program when he left.

Tree Planting Continues at High Level

The U. S. Department of Agriculture has announced that tree planting in the United States has surpassed 2 million acres during 1960.

Reports from USDA's Forest Service field offices, State foresters and other Federal departments show a total of 2,137,460 acres planted. Acreage planted to trees in 1959 was 2,151,743.

A listing of tree planting by acres for each State, with a comparison of 1959 and 1960 fiscal year totals as shown here.

A free copy of "Report of Forest and Windbarrier Planting in the United States—1960" may be obtained from Press Service, Office of Information, U.S. Department of Agriculture, Washington 25, D.C.

State	1959	1960
Ala.	214,519	186,148
Alaska	540	889
Ariz.	970	437
Ark.	81,339	72,607
Calif.	13,613	21,925
Colo.	2,375	2,957
Conn.	1,409	1,351
Del.	905	793
Fla.	204,153	198,963
Ga.	335,493	330,196
Hawaii	653	600
Idaho	5,818	6,282
Ill.	7,496	6,745
Ind.	7,276	5,702
Iowa	1,774	1,513
Kans.	2,152	1,494
Ky.	15,830	17,433
La.	200,617	190,751
Maine	1,893	4,745
Md.	5,214	6,657
Mass.	1,062	694
Mich.	424,378	53,953
Minn.	25,373	33,224
Miss.	168,292	171,105
Mo.	7,569	10,204
Mont.	4,278	5,305
Nebr.	5,729	6,510
Nev.	45	81
N.H.	2,548	2,066
N.J.	838	668
N.Mex.	419	431
N.Y.	39,196	40,415
N.C.	87,417	72,916
N.Dak.	12,095	12,223
Ohio	15,922	16,653
Okla.	6,484	4,778
Oreg.	102,630	120,597
Pa.	42,393	40,621
Puerto Rico	1,897	2,173
R.I.	236	317
S.C.	168,251	187,700
S.Dak.	8,943	9,828
Tenn.	64,308	48,811
Tex.	73,072	68,596
Utah	246	278
Vt.	3,213	7,138
Va.	38,750	35,186
Wash.	63,049	68,874
W.Va.	7,281	5,012
Wis.	52,935	52,104
Wyo.	750	811
Grand Total	2,151,743	2,137,460

Forestry Scholarships Are Again Offered by Continental

For the eighth consecutive year, the Continental Woodlands Division of Continental Can Co. Inc. is announcing its scholarship program for 1961. This program provides two forestry scholarships. Each scholarship is for $1,000.00 per year for four years of study in the field of professional forestry, or for a total of $4,000.00 each.

These scholarships were previously awarded in the name of Gair Woodlands Corp. which recently merged with Continental Can Co. Inc.

Successful applicants will be permitted to indicate their preference to attend the Forestry School of The University of Georgia; the University of Florida; the North Carolina State College; or the Clemson Agricultural College in South Carolina.

Completed applications must be submitted to the local high school principals not later than April 1, 1961.

For more information, write to: Continental Woodlands Division of Continental Can Co. Inc., P.O. Box 607, Savannah, Ga.

Specialized Consulting Service

A consulting service has been formed to offer full and impartial guidance to the pulp industry on the problems of "Selling in Depth." Roger Egan Associates, consultants in pulp and paper economy and sales, is staffed and qualified to give information, advice and research in the field of market pulp sales as well as many interrelated fields of paper sales, processing, finance and the stock market. Roger Egan Associates is located in New York, N.Y.

Conoflow Selects Georgia Sales Agency

The Procester Co. of Atlanta, Ga., has been appointed as the sales agency for Conoflow Corp. of Philadelphia, Pa. J. R. Simpson, Conoflow's sales manager, announced that the Procester Co. will be exclusive representative for Conoflow in the state of Georgia and eastern Tennessee. Conoflow Corp. is a subsidiary of the Walworth Co. and manufactures final control elements.

Mailing address for the Procester Co. is 2859 Ridgemore Road, N.W., Atlanta 18, Ga.

New Agency for Griffith Rubber Mills

Morton and Stanton Advertising of Portland, Ore., has been appointed as the new agency for Griffith Rubber Mills.

New programs for all divisions of Griffith Rubber Mills will be developed by the agency. It will include marine, extruded, pulp & paper and custom manufacturing. Henry J. Morton, agency partner, will be the account supervisor. Griffith Rubber Mills will celebrate its 50th anniversary during 1961.

recent expansions

Continental Begins Operations at New Board Mill

A new bleached paperboard mill, located near Augusta, Ga., is now being operated by Continental Can Co. The new mill is a single $40,000,000 integrated system producing linerboard and bleached board at the rate of 700,000 lbs. a day.

The bleached sulfate board (also known as special food board) will be used for paper tableware, cigarette boxes, cartons for frozen foods and ice cream; baked goods; dairy, meat and dry food products. Continental, — through its Robert Gair Paper Products Group and other divisions — is expected to consume the bulk of the new plant's output with the rest being offered to other board users.

Physically and technologically, the plant is termed the most modern and efficient by its engineers and architects, J. E. Sirrene Co. of Greenville, S.C. Many innovations in paper-making techniques, including automatic control of bleaching chemical feeds to maintain constant levels of brightness in the stock is included. Installation of a 110-ft.-high Kamyr continuous digester has also been made.

There are 900 acres on the site which is being devoted to purification lagoons permitting retention and treatment of waste for 75 days to prevent damage to aquatic life in the Savannah River. Air pollution is minimized by equipment which burns off waste gases before venting and by high-efficiency dust filters in the stack systems.

Key personnel posts include: William L. Schnorbach as plant manager; Raymond McCormick as general superintendent; Brookshire Moore as paper mill superintendent; Vernon Bodenheimer as technical director; W. L. Coker as plant accountant and office manager; George Clossay as personnel supervisor; and Robert Ervin as director of engineering and maintenance.

Salt Cake Recovery Unit Designed by Kopper Co.

A newly-designed electrostatic precipitator, which will recover almost $1,000 worth of salt cake a day, has been completely installed at Rome Kraft Co., Rome, Ga. Designed, fabricated and erected by the Metal Products Division of Koppers Co. Inc., Baltimore, Md., the salt cake recovery unit will remove daily some 29 tons or 95 per cent of the salt cake from the boiler gas of the paper mill.

The double chamber precipitator will handle 170,000 cu. ft. of gas per minute from the recovery boiler through which will pass 1,667,500 lbs. of dry solids per day. In kraft mill operation the recovered salt cake is returned for re-use in the manufacturing process.

Rust Engineering Co. of Birmingham, Ala., is the engineering and construction firm in the Rome Kraft expansion program.

American Can Co. Opens New Division

American Can Co. is establishing a new major product division with responsibility for the production and sales of paperboard milk containers. Organization of the division coincides with the company's first commercial introduction of a new two-quart, plastic-laminated-paper milk container. Addition of the new container currently being introduced will broaden the company's product line for the milk industry to include cartons formed in the dairy as well as the factory-made, flat-top container which American Can pioneered and has sold for many years.

The Milk Container Division will be the fifth among the company's product divisions, which include: Bradley-Sun; Canco; Dixie Cup; and Marathon. In addition, the American-Wheaton Glass Corp. is a majority-owned subsidiary.

Neil Kingsnorth, who has been vice president in charge of manufacturing of the Dixie Cup Division, will become vice president and general manager of the Milk Container Division, with headquarters in New York, N.Y.

Renneburg Expands

Edw. Renneburg & Sons Co. of Baltimore, Md., has recently completed their new research & development center. Located near their main plant in Baltimore, the new center includes a modern product testing laboratory and pilot plant facilities.

SCA to Invest $20 Million

The Swedish Cellulose Co. will invest about 100 million Kr. or $20 million, annually over the next few years. SCA sales have shown an overall rise of 15 per cent in the last two years. Newsprint is the most rapidly expanding of the company's products.

Holyoke Machine Co. Expands

The Holyoke Machine Co., Holyoke, Mass., manufacturers of calender rolls, has recently completed another addition to its plant facilities. This is the third expansion in eight years and doubles the company's storage and warehousing space while stepping up the space devoted to finishing operations some 20 per cent.

Continued on page 882

OFF AGAIN ON AGAIN SAVE AGAIN

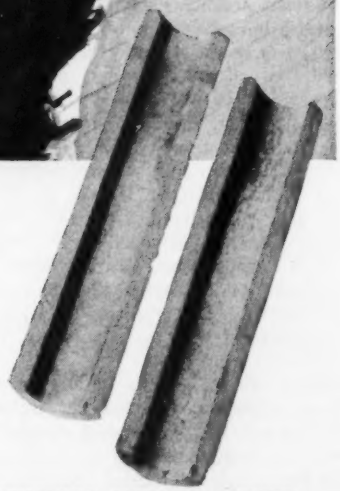
with Unibestos reusable pipe insulation

Why is Unibestos worth more at competitive prices than other insulations? One California refinery required removal and replacement of Unibestos insulation from a 24-inch line TWICE A MONTH FOR FIVE YEARS! Naturally, these people now use Unibestos exclusively.

Everywhere . . . in refineries, power plants, process industries . . . once Unibestos is put to work, we have a steady customer. All we ask is a chance to show *you* how Unibestos can be constantly and effectively reused; how it resists impact and rough handling; eliminates shrinkage; defies thermal shock, fumes, acids and moisture; cuts application time and costs; and guarantees real insulating efficiency. Only Unibestos is made from the exceptionally long fibers of tough *Amosite* asbestos.

Available in full range of standard pipe sizes and in block form. Single thickness to five inches. Specials to 44″ O.D.

Write today, on your letterhead, for Bulletin No. 65610.



UNIBESTOS AFTER 25 REUSES

Unretouched photograph of typical sections of Unibestos pipe insulation after 25 reuses. Rugged qualities of Unibestos make reuse on changed lines or test lines standard operating procedure under all types of conditions.

UNIBESTOS

worth more, yet sold at competitive prices

UNARCO ®

UNARCO PRODUCTS

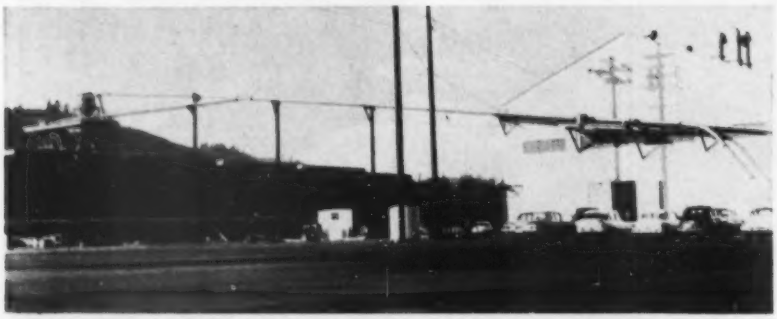
• UNIBESTOS, Amosite Asbestos Pipe Covering and Block • Calcium Silicate Pipe Covering and Block • 85% Magnesia Pipe Covering and Block • Mineral Fiber Block • Wrap-On Insulation • Lace-On Insulation • Turbine Blankets • Insulating and Finishing Cements • Asbestos Textiles • Packing and Gasketing.

UNION ASBESTOS AND RUBBER COMPANY • FIBROUS PRODUCTS DIVISION

DEPT. 283, Bloomington, Illinois

For more data circle 128 on Post Card

Continued from page 880



Twin high-pressure pneumatic conveying systems in operation at the new Crown Zellerbach sawmill. Pulp chips and sawdust are carried to Twin Car-Loader for transport to company's pulp plant.

High-Pressure Pneumatic Conveying Systems at C-Z

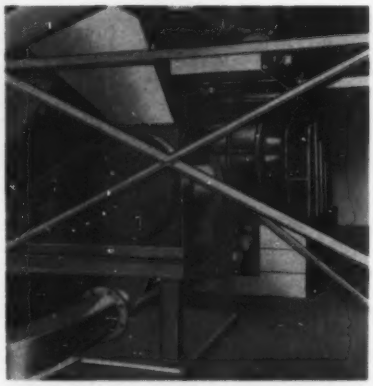
Crown Zellerbach Corp.'s small log sawmill located at Columbia City, Ore. has given special attention to the utilization of all wood product materials — sawdust as well as pulp chips.

At this new mill, C-Z has recently put into operation, two high-pressure pneumatic conveying systems designed and built by Archer Blower & Pipe Co. Inc. of Portland, Ore. The twin-systems convey screened pulp chips 250 ft. and screened sawdust 300 ft. separately to an Archer Blower Twin Car-Loader which loads parallel cars simultaneously for transport to the company's pulp plant.

Each system consists of an Archer Blower Improved Air-Lock Rotary Feeder and Positive Blower Assembly which is designed to convey chips and sawdust a predetermined distance at a predetermined tons per hour capacity. The feeder acts as a metering device, injecting screened material into the discharge pipeline without allowing air to escape.

Pulp chip system — This system conveys up to 60 tons per hour of screened chips through a 12-in. pipeline to the Archer Car-Loader. Designed with a bypass switch-valve and auxiliary discharge pipeline, it can be extended to include an outside chip storage area at a later date if desired. This auxiliary system will permit chippers to run continuously while chip cars are being switched in and out of the loading station.

Sawdust system — This system is rated at 30 tons per hour capacity with material being conveyed several hundred ft. through 8⅝-in.-high pressure discharge pipeline. Cars to be loaded are on a track adjacent to the chip cars and are loaded from a dual-outlet-type Archer High Pressure Cyclone. This arrangement permits immediate transfer of fill operations to an adjacent empty car enabling the system to operate continuously.



Archer Rotary Feeder and Positive Blower Assembly conveying screen sawdust at the new sawmill. This system is rated at 30 tons per hour capacity.

Both Archer systems are controlled by electrical control panels. The controls will automatically stop the feeding of material to the pipeline if the pressure in the pipeline momentarily exceeds the design rating of the system. When the pressure returns to normal, the system is automatically re-started. This automatic control of the flow of material into the system prevents line plugging and overloading.

Allied Chemical Expands Solvay Division

Allied Chemical Corp. has announced plans for the expansion of its Solvay Process Division's chlorine-caustic soda facilities at Moundsville, W. Va. The new facilities will increase the chlorinated methanes capacity by approximately 40 per cent.

Other products manufactured by the division at Moundsville are chlorine, caustic soda and vinyl chloride.

Sonoco Dedicates New Lab

The Sonoco Products Co. of Hartsville, S.C., recently dedicated its new Research Laboratories building in memory of Dr. James Edward Mills — Sonoco's first chief chemist and research director.

Mills, who died in 1950, was a recognized authority on paper chemistry. He joined Sonoco in 1934, where he did extensive work on lacquers, thinners, synthetic resins, adhesives for plant consumption and other Sonoco firsts.

Included in the new building are 10 laboratories, each with a variety of equipment to give Sonoco the facilities for more extensive experimentation and research. New features include a paper pilot plant and a constant temperature control room.

Rayonier Adds "Dust Catcher"

Rayonier Inc. has started installation of a huge electrostatic "dust catcher" as part of its expansion program at its Gray's Harbor mill. This was an all-out move to utilize the most advanced air pollution control equipment.

Designed and built by the Metal Products Division of Koppers Co. Inc., Baltimore, Md., the unit is an electrostatic precipitator and is attached to the base of the stack leading from the boiler of the new sodium base liquor recovery system. The precipitator will trap fine particles of sodium sulfite which is usually blown out of the stack and over the surrounding area. Approximately 55 tons of material in a 24-hr. day is expected to be trapped when the unit is in full operation.

Cost of the new "dust catcher" is approximately $225,000.

Stebbins constructs new laboratory and processing facilities

A new laboratory and facilities for processing special proprietary acid-resisting compounds are now under construction adjacent to the main building

Continued on page 885

*Idea submitted by Norbert Gossens, Kimberly-Clark Corp., Neenah, Wisconsin
Photo by: H. Armstrong Roberts

Falls in Glacier National Park, Montana

HAM FELTZ says:

"Reminds me that HAMILTON Felts provide a steady, profitable flow of stock!"

"Because Hamilton Felts always stand up well under the steady, unrelenting flow of stock, and the constant pressures of making paper and box board, they give you long, trouble-free service and consistent, high quality performance. This results in less down time for paper makers and better operational profits.

"So if fast, copious water removal, long lasting, usable felts, and the profit accruing from operational savings and increased tonnage are what you want, why not start using us soon as one source of your felt supply? Just discuss your problems with your Hamilton Felts Service Salesman. If one of our 300 modern, technically proven styles won't solve *your* needs we'll be happy to design a Hamilton Felt that will."

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Hamilton
FELTS

*WIN . . . *A NEW Shakespeare Spincast Fishing Outfit!*

"What famous place reminds you of Hamilton Felts? Tell us why in a few words; sign your name and address and name of company. Each idea from a U.S. papermaker that we use wins a new 1961 model Shakespeare Spincast Rod and Reel—FREE! When identical winning ideas are submitted by 2 or more papermakers, the one with the earliest postmark will be considered the winner. Every U.S. papermaker *entrant* receives a famous Rex Spoon fishing lure — FREE. Send me your suggestion — today. Ham Feltz, 612 First National Bank Bldg., Cincinnati 2, Ohio."

SHULER & BENNINGHOFEN, HAMILTON, OHIO

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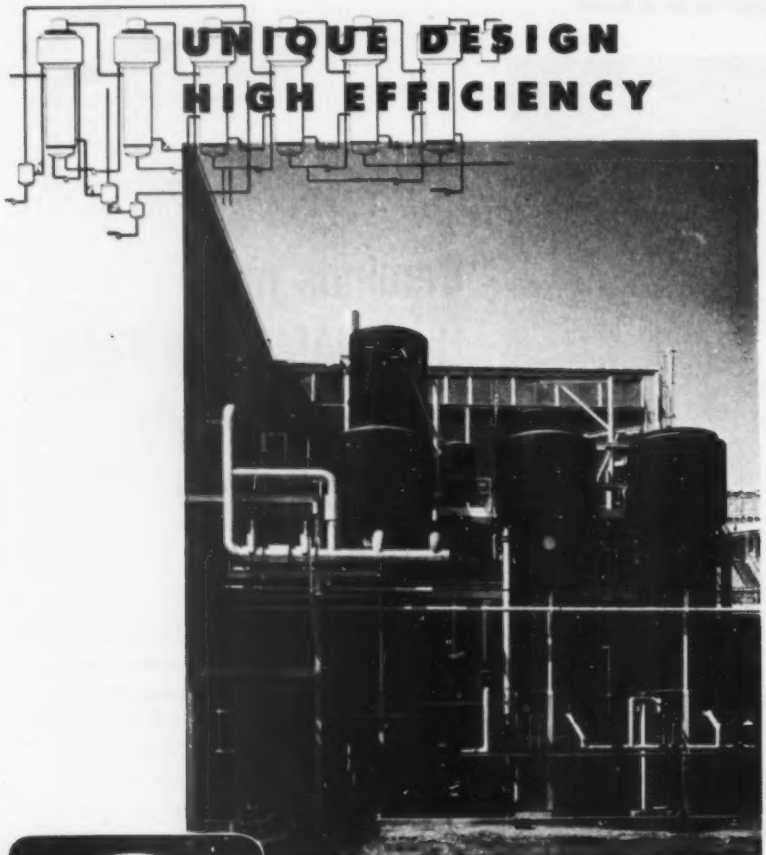

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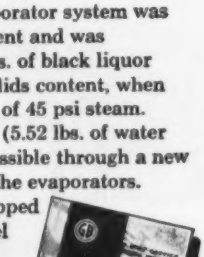
BLACK LIQUOR EVAPORATOR at NEW SOUTHERN PAPER MILL

This six body, sextuple effect evaporator system was installed in a U-shaped arrangement and was designed to concentrate 428,000 lbs. of black liquor from 14 per cent to 50 per cent solids content, when supplied with 56,000 lbs. per hour of 45 psi steam. The high efficiency of this system (5.52 lbs. of water per pound of steam) was made possible through a new and novel feed arrangement into the evaporators. The first effect evaporator is equipped with 2 inch diameter stainless steel tubes while the other five have welded seam carbon steel tubes.



For more detailed information write for bulletin #PP 509-1

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CONTRACT MANUFACTURING
including HEAVY CASTINGS

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Coming Events

TAPPI

March 16 — Graphic Arts, Inman's Restaurant, Galesburg, Mich.
April 6 — Visit Michigan Carton, Inman's Restaurant, Galesburg, Mich.
May 4 — Pacific Coast Division, Tri-way meeting (PIMA, CPPA, TAPPI), Harrison Hot Springs Hotel, Harrison Hot Springs, B. C., Canada.
May 8-10 — 12th annual TAPPI Coating Conference, Buffalo, N.Y.
May 10-12 — Pulp and Paper Instrumentation Symposium, Northland Hotel, Green Bay, Wis.
May 25 — Recognition Night, (with PIMA), Gull Harbor, Richland, Mich.
June 20 — Fun Day (with PIMA), Gull Lake Country Club, Richland, Mich.

PIMA

March 16 — Joint Meeting with Craftsmen, Inman's Restaurant, Galesburg, Mich.
April 21 — New York-Canadian Division, Eastman Kodak Co., Kodak Park, Rochester, N.Y.
April 22 — Ladies' Night, Hotel Harris, Kalamazoo, Mich.
May 4 — Pacific Coast Division, Tri-Way Meeting (PIMA, CPPA, TAPPI), Harrison Hot Springs, B. C., Canada.
May 11-13 — Pennsylvania-New Jersey-Delaware Division, Yorktowne Hotel, York, Pa.
May 25 — Recognition Night (with TAPPI), Gull Harbor Inn, Richland, Mich.
June 7-9 — National Meeting, Hotel Robert Meyer, Jacksonville, Fla.
June 20 — Joint Meeting with TAPPI, Gull Lake Country Club, Gull Lake, Mich.

OTHER MEETINGS

March 20-22 — Folding Paper Box Association of America, Annual Meeting, Drake Hotel, Chicago, Ill.
March 21-23 — American Power Conference, Sherman Hotel, Chicago, Ill.
March 27-29 — 15th Anniversary of the Advertising Essentials and National Sales Aids Show, Hotel Biltmore, New York, N.Y.
March 27-31 — Symposium on Temperature, Columbus, O.
March 31 — Joint Meeting for Packaging Institute and National Paper Box, Sheraton Hotel, Philadelphia, Pa.
April 7 — Second Annual Convention of the Ottawa Valley Branch, CPPA, Technical Section, Chateau Laurier, Ottawa, Canada.
April 10-13 — 30th National Packaging Exposition, Exposition Center, Chicago, Ill.
May 1-5 — 1961 Conference of the American Society of Training Directors, Bellevue-Stratford Hotel, Philadelphia, Pa.

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NEWS OF THE INDUSTRY

Continued from page 882

of the Stebbins Engineering & Mfg. Co. at Watertown, N.Y. The reinforced concrete, steel and cement block structure, containing approximately 15,000 sq. ft. of floor space on two floors, will be completely fireproof and partially air-conditioned. This is Stebbins' third expansion at Watertown.

Sutorbilt Appoints Southeast Representative

Sutorbilt Corp. of Compton, Calif., has appointed the Bayliss Machine & Welding Co. of Birmingham, Ala., to serve the southeast as part of its expanding network of "service centers."

These centers are established in centrally-located areas in the country in order to provide increased customer service. Each center carries a stock of repair parts and consignments of complete assemblies in certain blower sizes. Sutorbilt manufactures rotary positive displacement blowers and gas pumps.

Antara Chemicals appoints Missouri Solvents & Chemical Co.

Missouri Solvents & Chemicals Co. has been appointed distributor for two major chemical product lines by Antara Chemicals, a Division of General Aniline & Film Corp., New York. Under this arrangement, the Missouri company will handle Igepal Surfactants and Cheelox chelating and sequestering agents for St. Louis, Kansas City, South Illinois, West Kentucky, Tennessee, North Arkansas, Missouri, Kansas, South Iowa and South-East Nebraska.

W. R. Grace Will Make Clupak From Bagasse

The W. R. Grace & Co. subsidiary — Sociedad Agricola Limitaded of Paramonga, Peru — has signed a license to make Clupak extensible paper. This is Clupak Inc.'s first South American licensee and brings to 21 the number of licensees the company has in six different countries.

Clupak, in its research and development laboratory, made experimental trial runs and tests of extensible paper made from bagasse and found that the process added materially to the strength and toughness of bagasse paper.

The extensible device used to make Clupak, will be installed on the No. 1 machine of Sociedad Agricola in Paramonga. This machine has a wire width of 110 in. and an annual capacity of 15,000 tons. Initial use will be for multiwall sacks, particularly for the shipping of fish meal fertilizer.

Construction Started on U. S. I's Swiss Headquarters

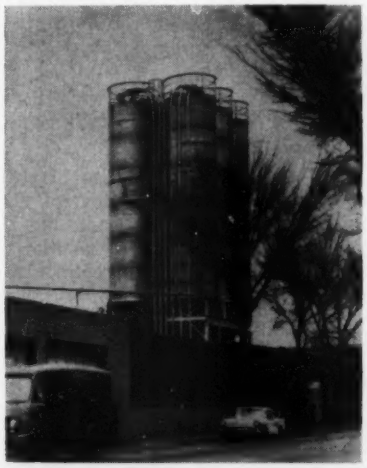
Construction was started recently on a new building to house U.S. Industrial Chemical Co.'s European technical service laboratory and sales offices. The new building, located in Baar, Canton of Zug, Switzerland, will be the headquarters of U.S. Industrial Chemicals Co. — International, which was formed in November, 1959.

This technical service laboratory is designed for polyethylene research, evaluation and service to U.S.I. International's European distributors and customers. European processing and testing equipment will be used to develop and perfect uses of the company's polyethylene resin marketed under the trade name Petrothene.

Airveying System Speeds Handling of Material at H.P. Smith Co.

H. P. Smith Paper Co. of Chicago, Ill., has been using an airveying system to convey polyethylene pellets from dry flo cars to six silos; then to the polyethylene extrusion coaters. This new system has considerably accelerated the handling of plastics materials to keep pace with expanding production of extrusion coatings.

Airveying, as it is called, is conveying materials by air. With this system, the plant can receive the bulk of its polyethylene stocks direct from dry flo cars for storage in the silos.



The six silos are mounted on the roof in banks of three, and have capacities of 80,000 lbs. each. There are actually two Airveying systems in operation; one moving the poly from rail cars to the silos, and the other from the silos to the coating equipment for distribution to the extrusion coaters where the material is applied to papers, films, foils, fabrics and boards.

NAMES IN THE NEWS

J. P. Greiveldinger

N. A. Pease

M. H. Reck

W. G. Hurd

Continental Can Co.

J. P. Greiveldinger, formerly manager of manufacturing engineering at Continental Can's Fibre Drum and Corrugated Box Division, has become eastern district general manager of the firm's newly formed Corrugated Container Division.

N. A. Pease, previously assistant to the manager of manufacturing engineering at the old Fibre Drum and Corrugated Box Division, is now manager of manufacturing engineering for the New Division.

St. Regis Paper Co.

J. Burk LeClere, president of the F. J. Kress Box Co. Division of St. Regis Paper Co., New York, N.Y., has retired. LeClere, who is also a director of St. Regis, will continue to serve on the board.

A. E. Staley Mfg. Co.

William B. Bishop has been appointed director of facilities planning for A. E. Staley Mfg. Co. of Decatur, Ill. Bishop has been general superintendent of the company's Decatur plant since 1959.

Hudson Pulp & Paper Corp.

Rodney L. Hill has joined the Hudson Pulp & Paper Corp. as a researcch engineer. He will be coordinating chemical project work at the company's laboratories in South Windham, Me.

Jamesbury Corp.

Maxwell H. Reck, assistant sales manager for the past three years, has been named sales manager of Jamesbury Corp., Worcester, Mass.

W. G. Bill Hurd, formerly Jamesbury district sales manager for the southeastern United States, has been named assistant sales manager. Both men will be based in Worcester, Mass.

Antara Chemicals Division, General Aniline & Film Corp.

Francis Charles has been appointed to the position of director of manufacturing and will be responsible for the manufacture of chemicals within this division of the New York company.

James M. Cloney has been appointed to the position of director of marketing and will be responsible for all sales activities of the division. Cloney was formerly sales manager.

Dr. Frederick J. Gajewski has been named technical director, charged with responsibility for the technical research and technical engineering departments.

Wallace G. Clarke, formerly area supervisor, has been appointed special assistant to the general manager.

Fairbanks Morse Co.

Thomas G. Lanphier Jr. has been elected president of Fairbanks Morse & Co. As president of Fairbanks Morse, he will continue to serve concurrently as a vice-president of the parent company, Fairbanks Whitney Corp.

Riegel Paper Corp.

Dr. Lamar A. Moss, formerly manager of manufacturing services, has been named technical director. He will devote his time to research and development.

Donald G. Magill, formerly technical director, is now Upper Mills manager. Magill will supervise paper production at the Warren Glen, Riegelsville and Hughesville, N.J., mills.

Lawrence N. Agnew, formerly superintendent, has been named production manager of the Milford, N.J., mill.

Donald Newcomb has been transferred from superintendent of Hughesville mill to superintendent of the coating department at Milford.

Richard W. Flores, formerly acting superintendent of the Riegelsville mill, was appointed Upper Mills technical superintendent.

James Galloway, previously superintendent of finishing at Milford, was named superintendent of Riegelsville.

Joseph Judge was promoted from assistant to superintendent of Hughesville replacing Newcomb.

Wolfgang O. Wilfert has been transferred from superintendent of coating to superintendent of converting.

William Anderson is now director of converting development. He formerly was superintendent of converting.

Lawrence L. Schroth assumes Galloway's position of superintendent of Milford finishing.

Strathmore Paper Co.

Henry D. Johnston, vice-president since 1957 and a member of the board of directors since 1951, has been elected president of the Strathmore Paper Co., West Springfield, Mass.

Bemis P. Wood has been promoted from general superintendent to vice-president in charge of production. He succeeds Laurence W. Shattuck who has retired.

Roy F. Arnold has retired as manager of product development and as

a member of the board of directors.

Harold A. Bolles has retired as superintendent of the No. 2 mill in Woronoco, Mass., but remains as a director and consultant to the company.

Robert B. Clark Jr., manager of printing paper sales, and Peter G. Volanakis, manager of technical paper sales, have been elected to the board of directors.

Chicago Bridge & Iron Co.

Gordon R. Loveless, manager of the Salt Lake City plant since 1957, has been appointed manager of the eastern plant at Greenville, Pa., of Chicago Bridge & Iron Co.

Alfred J. Larson, formerly assigned to the Greenville plant, will succeed Loveless.

Allied Chemical Corp.

Otto G. Direnga has been named director of research administration for Allied Chemical Corp. He has been director of planning research for the past two years.

Walter G. King Jr. succeeds Direnga as director of planning. He previously served as assistant manager.

Charles D. Boyer Jr., formerly manager of engineering research, is now assistant director.

Nashua Corp.

Philip S. Hanrahan has been appointed sales representative for the Converter Sales Division of Nashua Corp., Nashua, N.H. He will be in charge of a new sales territory in the St. Louis, Mo., area. Hanrahan will be responsible for providing information and bulletins to corrugated box manufacturers.

Dow Chemical Co.

Edward Novick has been transferred from Dow's Midland, Mich., headquarters to the Boston, Mass., office with prime responsibility for handling Dow products used in the pulp and paper industry. He will be in charge of the New England states and upstate New York.

Consolidated Water Power & Paper Co.

John Kruger, quality control engineer in the Wisconsin Rapids Division of Consolidated Water Power & Paper Co., has been appointed assistant superintendent of the coating department. Kruger joined the technical staff at the mill in 1957.

William G. Stake has been named clerical supervisor in the maintenance department. Stake has been serving as plant and property clerk in the department.

R. Halder

D. I. Pittsley

Wausau Paper Mills Co.

Robert Halder has been appointed purchasing agent for Wausau Paper Mills Co. at Brokaw, Wis. Halder has been safety director and has worked in the mill's maintenance department.

Donald I. Pittsley has been appointed safety director for Wausau Paper Mills Co. at Brokaw. Pittsley has worked in the engineering department and has been timekeeper.

Sonoco Products Co.

Charles W. Coker has been named as president of Sonoco Products Co., Hartsville, S. C. Coker is president of Sonoco Products Co. of Canada Ltd., director of Sonoco de Mexico, and director of Textile Paper Tube Co. of Manchester, Eng. He has also served as a director for National Fibre Can & Tube Association and recently was elected as vice president, southern area.

Atlas Refinery Inc.

James K. Koeniger has been appointed to the sales staff. Koeniger will handle sales to industries in northern New Jersey, Connecticut, and eastern New York. He was formerly plant manager of the Newark division of the Blanchard Bro. & Lane Inc.

Thilmany Pulp & Paper Co.

R. E. Driessen has been named production manager of Mill No. 1 of Thilmany Pulp & Paper Co., Kaukauna, Wis. Driessen's responsibilities involve converting operation, which include various treatments with asphalt, wax and polyethylene, as well as decorating and finishing.

P. H. West has been appointed production manager of Mill No. 2. His responsibilities include pulp and paper manufacture, supercalendering, and bag conversion.

R. C. Dressler, a division manager in the paper mill, has been promoted to pulp mill superintendent, succeeding West.

George Paschen, formerly shift supervisor, was named to succeed Dressler as manager of paper mill Division B-2, comprising paper machines Nos. 6, 7, 8 and 10.

E. D. Jones Corp.

W. C. Hand has been appointed sales engineer covering the territories of California, New Mexico, Arizona and Hawaii for E. D. Jones Corp. of Pittsfield, Mass. Hand has served for the past 8 years in the Jones headquarter sales group, the last 4 in the capacity of assistant to the headquarter sales manager.

W. E. Crawford

W. C. Hand

Wrenn Paper Co.

William E. Crawford has been named production manager for Wrenn Paper Co., Middletown, Ohio. Crawford is responsible for the company's production of technical papers. He has been with the company since 1946.

Scott Paper Co.

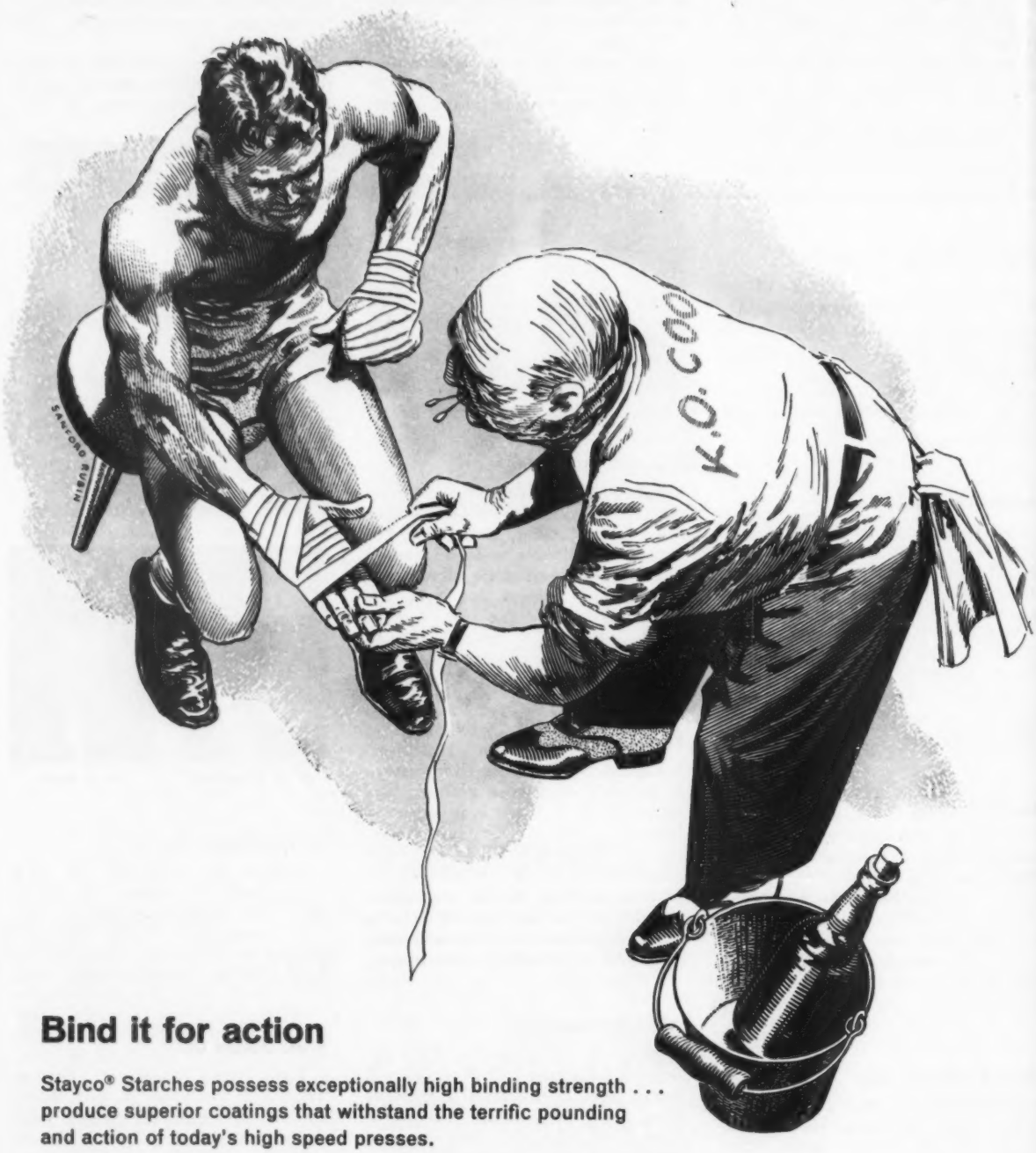
Paul Brown, Loren V. Forman, Thomas B. McCabe Jr. and Robert Thieme have been named vice presidents of Scott Paper Co., Chester, Pa.

William J. Gehlen has been named manager of the company's largest plant in Chester, Pa. Gehlen will be responsible for all activity at this plant which houses ten paper machines.

D. J. Dughie, currently plant manager at Marinette, will assume the title of general manager, Wisconsin mills. In his new post, Dughie will assume the additional responsibility of overseeing operations at the Oconto Falls plant.

Walter C. Miller will replace Gehlen as plant manager at Fort Edward,

(Continued on page 889)



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Stayco® Starches possess exceptionally high binding strength . . . produce superior coatings that withstand the terrific pounding and action of today's high speed presses.

Optimum printability requires papers with coatings of highest adhesive quality . . . maximum binding strength. Stayco Starches improve pick resistance . . . increase internal bond and strength . . . produce superior coatings of low viscosity, high solids, excellent color and smoother printing surface to assure reproductions of eye-catching quality.

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For more data circle 132 on Post Card

NAMES IN THE NEWS

continued from page 887

N.Y. Miller is currently plant manager at Oconto Falls.

Robert W. Johnson has been promoted to the newly-created post of general superintendent at Oconto Falls. He is currently serving as purchasing agent and traffic manager at that plant.

Armand M. Giguere, currently production manager at Marinette, has been named general superintendent at Marinette.

NECROLOGY

Erie L. Hedstrom

Erie L. Hedstrom was former president of the Cooper Paper Box Co., Buffalo, N.Y. He joined Cooper in 1923 when his father purchased the business.

Dr. Paul P. McClellan

Dr. Paul P. McClellan was staff associate in research administration for Jefferson Chemical Co. Inc., Houston, Texas. He held various positions with Firestone Tire & Rubber Co. and American Cyanamid Co.

Frederick Weyerhaeuser

Frederick Weyerhaeuser was a lumber executive, and grandson of the founder of the Weyerhaeuser Lumber Co. He was vice president and director of the Rock Island, Ill., Lumber Co. and the Rock Island Millwork Co., both Weyerhaeuser subsidiaries.

Vincent R. Hann

Vincent R. Hann, was president and treasurer of Merrimac Paper Co. Inc., New York. Hann was a member of the Chemists' Club, a director of the Association of Pulp Consumers, a member of the American Paper and Pulp Association and the Kraft Paper Association.

Gerald B. Higgs

Gerald B. Higgs was Atlanta district sales manager of Wausau Paper Mills Co., Brokaw, Wis. Higgs had been associated with Wausau Papers in Atlanta and the southeastern area since 1959. He was a past president of the Southerns Inc., suppliers to the Southern Paper Trade Association.

Joseph M. Conway

Joseph M. Conway was president of the Charmin Paper Products Co. from 1925 until 1927. Conway was also president of National Tissue Manufacturer's Association and a director of U. S. Paper & Pulp Producer's Association.

Marcy B. Newell

Marcy B. Newell was mill process engineer, Ecusta Paper operations of the Packaging Division of Olin Mathieson Chemical Corp., Pisgah Forest, N.C. Newell was a member of TAPPI, and American Society of Chemical Engineers.

James L. Coker III

James L. Coker III was president of Sonoco Products Co. Coker was also director of Textile Paper Tube Co. Ltd., Romiley, Eng.; Sonoco Products Co. of Canada Ltd.; Sonoco de Mexico; Indian Textile Paper Tube Co. Ltd.; Textile Cones and Tubes Pty. of Australia; and National Fibre Can & Tube Association.

Carl H. Mortimer

Carl H. Mortimer was vice president of Whitaker Paper Co. of New York, N.Y.

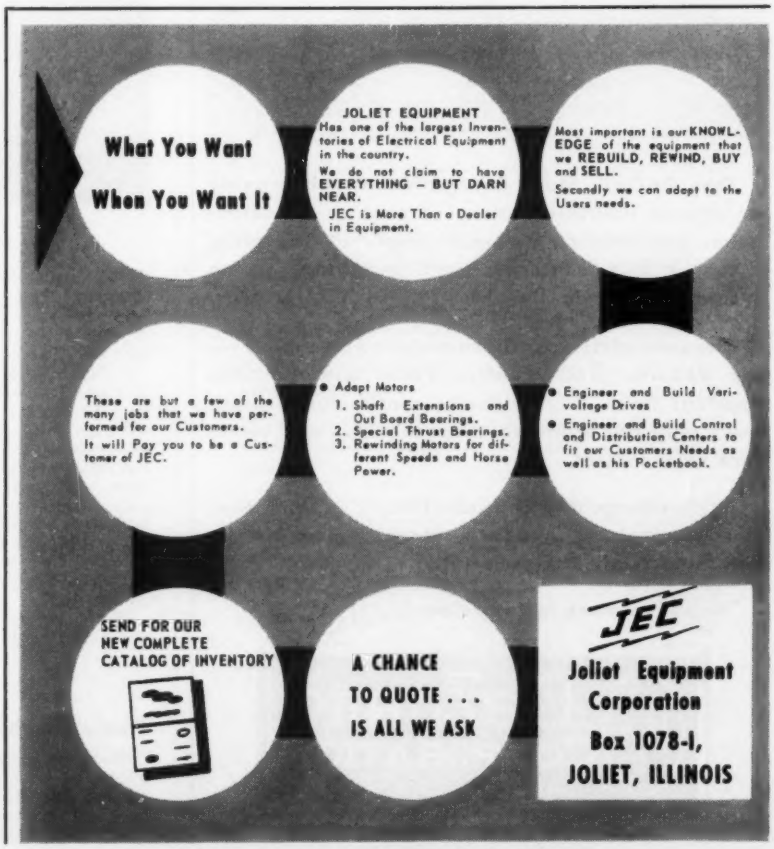
Sir Arthur Reed

Sir Arthur Reed, a paper manufacturer and former Conservative member of Parliament, died. He served in the House of Commons and was on the governing body of Exeter University.

M. L. Madden

M. L. Madden was former president and chairman of the board of Hollingsworth & Whitney Paper Co., Gardner Me. from 1945 to 1954. The company is now a division of Scott Paper Co., Chester, Pa.

Stanley Bell

Stanley Bell was director of supplies and marketing of Bowater Paper Corp. Ltd. Bell was a director of Bowater Paper Corp. of North America and chairman or director of eleven other companies in the Bowater organization.

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FOREIGN ABSTRACTS

Topochemistry of wood digestions

During the various types of chemical digestions, the changes occurring in the wood may include: solution of the middle lamella, a localized attack on the outer part of the secondary wall, the marked swelling of the latter, and (when special precautions are taken) a hydrolysis of the tertiary wall. These changes depend mainly on the kinetics of two different reactions, lignin removal and the hydrolysis (or chemical attack) on the polysaccharides.

Figure 1 shows a partial delignification of spruce wood with calcium bisulfite. Here the middle lamella has been dissolved and there has been a partial delignification of the cell wall. However due to an incompleted topochemical reaction, there are still dark spots visible in the corners, and the delignification is incomplete. The author has inaugurated a staining reaction that permits following the topochemical reaction associated with carbohydrate cleavage. The wood sample is treated with Cibacron Brilliant Orange and then subjected to hydrolysis which is often graded. This reaction gives rise to a spectral transmission curve which was quite different from that given by the dye alone.

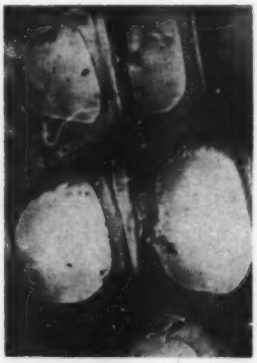


Fig. 1

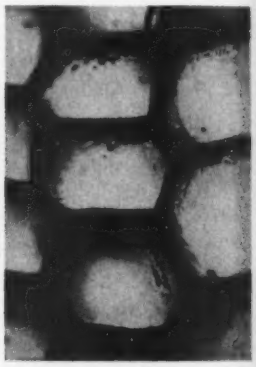


Fig. 2

In Figure 2, an appropriately stained sprucewood is shown, in which there has been a selective hydrolysis of the tertiary wall by means of monochloroacetica acid, which has little effect on the primary lamella or on the secondary wall. However even for the tertiary wall this was only a partial hydrolysis. The hydrolyzate contained largely xylose and mannose, with smaller amounts of arabinose and galactose, and only 2 per cent glucose. No uronic acids were found in this hydrolyzate, although there was strong evidence that they were originally present in the tertiary wall (indicated by the Victoria Blue reaction). Apparently these uronic acids are held in difficultly hydrolyzable granules (shown in the photomicrograph).

28 references. Hans Bucher. **Das Papier** 14, 542-9 (1960) In German, with English and French summaries.

Studies in chipping

Problems arising in pulp mills and evaluation of chip quality are discussed, and it was shown that there are marked differences in size distribution when sorting by mechanical means and by hand. The results of applying chip analysis to a special case are given. This investigation dealt

with the influence of the sharpness of the chipper knives on the size distribution. It was found that the chip length distribution (**i.e.** the amount of fines and oversize chips) increased as the knives were getting blunt. However there were no significant differences in pulp quality when the acceptable chips were used in such pulping. It was also observed that the average chip length increased with increasing wear of the bed knife and the wearing plates of the chipper. Apparently there was a linear correlation between the thickness and the length of chips obtained in these experiments. Although the chipper fines gave pulp yields that were not significantly below the normal yields, the resulting pulp was weak and was easily out during beating.

Seven references. H. P. Dahm and F. Loschbrandt. **Norsk Skogind.** 14, No. 11, 419-426 (1960) (Original in Norwegian, with English summary).

Two-stage soda pulping of eucalypts

For about three years, a Kamyr continuous digester has been in service in pulping eucalypts, and the present paper is largely a progress report on the application of a two stage soda countercurrent pulping operation and the controls required to insure uniform pulp quality. The mechanical equipment used is also described briefly. In the case of the controls, the following are included:—throughput, permanganate number, and the use of 1 per cent sulfuric acid in removing inscluble ellagic acid deposits in heater tubes. Serious corrosion (as yet unexplained) has been experienced below the second-stage screen belt.

In a second paper, the production of semi-bleached cold soda pulps from Tasmanian eucalypts is described. Single stage bleaching is used and calcium hypochlorite is the reagent. The resulting pulp has a G. E. brightness of 70 to 72 per cent and is of a quality suitable for magazine printing papers. Printing trials proved satisfactory. Equipment in the operating Burnie mill includes an Anderson Fiberpress, a Sprout-Waldron 500 hp refiner, a centrifugal screen and centrifugal cleaners followed by washing and bleaching. All the pulps manufactured in this mill were converted into paper containing varying proportions of the soda pulp in a number of furnishes, and no special difficulties were encountered in the papermaking operations.

A. R. Sloman. **APPITA** 14, No. 2, 57-62 (discussion, 62-4) (Sept 1960) and Sloman and C. H. Turner, **Ibid.** 65-8 (discussion 68-70).

Pitch control in the pulp and paper industry

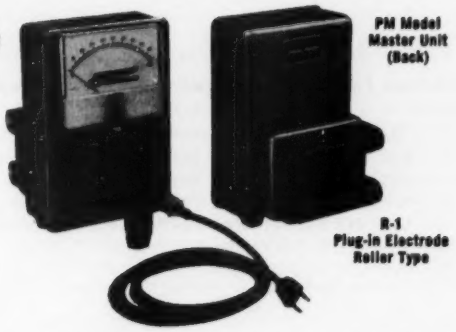
The present paper reviews and discusses previous work (much of it the author's own) on pulpwood resins and the effects of such resin on pulp and paper manufacture. The control of pitch is emphasized. Although a paper of this type does not lend itself readily to abstract, it is of such importance that a few areas should be stressed. These include the mechanical and chemical means used in deresinification, the effects of pulpwood storage, resin accumulation on solid surfaces, and more especially the principles to be applied in the control of pitch. **E.g.** pulp resins may be "stabilized" by attaching to their surfaces a layer of hydrophylic groups. These may be formed by oxidative reactions during storage. Other methods are discussed and evaluated. Pitch troubles in pulp mills, bleach plants, and in paper mills are described.

One of the controls in paper mills explored by the author involved the following. Because of the dangers of mill corrosion and also of a drop in paper quality, the pH in the white water system cannot be allowed to fall below a certain level. Hence the alum (aluminum sulfate) addition normally must be lowered gradually, and thus the aluminum ions gradually diminish. However, if sodium hydroxide or sodium aluminate is added (besides the addition of alum), a high, predetermined level of aluminum ions can be maintained in the white water, which can also be kept at a required pH. In this way, pitch control can be improved in accordance with principles that the author described previously in **Svensk Papperstidn.** 59, 319 (1956). In practice, 0.05 to 0.3 per cent sodium hydroxide is added to the dry pulp and thus a corresponding increase in alum can be used. This has been tested out by the author and proved efficient in a number of paper mill systems. Other pitch controls are discussed at some length.

93 references. Ernst Back. **Svensk Papperstidn.** 63, 793-802 (1960) (In English).

Continued on page 906

NEW INSTANT MOISTURE CHECK ON MOVING ROLLS



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PATENT REVIEWS

Dr. Melvin Nord

Machine for making triple wall corrugated paper board

U. S. 2,949,151, issued Aug. 16, 1960 to Samuel Goldstein and assigned to Tri-Wall Containers Inc., describes a machine for making triple wall corrugated paper board products.

As shown in fig. 1, the three sheets of single face corrugated paper board are brought over guides 18, and pass over hot preheating drums 19. An outer liner sheet passes around an idling roller 28, around a preheating drum 29 and then around idling rollers 31 in a position to be adhesively secured to the corrugated

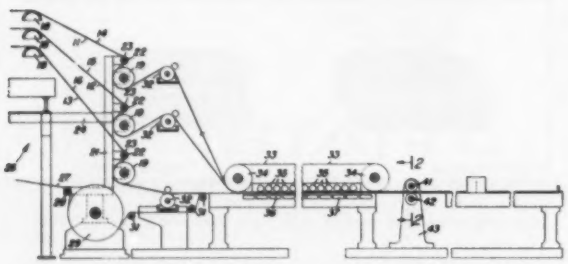


Fig. 1

sheet 13. The three sheets of single face corrugated paper board, thus preheated, are brought to gluing rolls 32 where glue is applied to the ridges of the corrugations. The four webs of paper are brought together beneath a belt 33. The belt 33 is mounted on pulleys 34 one of which constitutes a driving pulley. The belt 33 is weighted with metal rollers 35 and passes through a heating and drying section 36 where the composite sheets are adhesively secured to the adjacent liner sheet of the next adjacent composite sheet and the lowermost composite sheet is secured to the outer liner sheet. From the heating section the composite sheet, the seven layers of paper adhesively secured together, pass through a cooling section 37 to give the adhesive an opportunity to cool and set. From the drying and cooling sections of the combining machine, the composite board passes to a scoring, trimming and crushing machine.

Chemically assisted mechanical wood pulp

U. S. 2,956,918, issued Oct. 18, 1960 to Francis H. Snyder and assigned to Francis H. Snyder & Associates Inc., describes a process of obtaining a chemically assisted mechanical wood pulp.

The process consists of reducing the wood to chips, applying to the wood chips a slurry of lime in sufficient water to distribute the bulk of the lime over the chips with only minor drainage, storing the chips until the acetyl value has been largely consumed and subjecting the chips to a mechanical fiber separation operation.

Mineral Filled Paper

U. S. 2,949,397, issued Aug. 16, 1960 to Tyrell H. Werner, William H. Marra, and Warren B. Gilman, assigned to S.D. Warren Co., describes a method of making mineral-filled paper.

Finely divided mineral filler particles are coated with an aqueous colloidal dispersion of plant mucilage in the form of a substituted mannan (i.e. a manno-galactan or a gluco-mannan), by mixing an aqueous solution of the substituted mannan with the mineral filler particles. An aqueous pulp suspension containing cellulose fibers is intimately mixed with the coated finely divided mineral filler particles. The filler particles are attracted to the cellulose fibers and are retained in the pulp in the absence of alum. The pulp is then formed into paper.

Grease-proof paper

U. S. 2,957,796, issued Oct. 25, 1960 to Donald K. Pattilloch and Carl Polowczyk and assigned to Michigan Research Laboratories Inc. and Electro-Chem Fiber Seal Corp., describes a process of producing greaseproof paper.

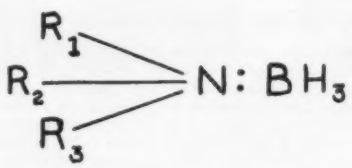
The process consists of reacting cellulose fibers while suspended in an aqueous medium with polyethylene imine, reacting the resulting reaction product with a perfluoroalkanoic acid containing from 4 to 10 carbon atoms, and forming the suspension into a sheet.

Bleaching of mechanical wood pulp with boranes

U. S. 2,960,427, issued Nov. 15, 1960 to Talivaldis Berzins and assigned to E. I. du Pont de Nemours & Co., describes a process for bleaching mechanically-disintegrated wood pulp by reduction.

The pulp is contacted at pH 3 to 14 with at least 0.04 per cent by weight of borane based on moisture-free pulp content.

The borane is supplied by a compound having the following formula.



R_1, R_2, and R_3 are hydrogen or alkyl radicals having up to 5 carbon atoms.

Other Patents of Interest

Subject	Inventor or Assignee	Patent No.	Date
Paper glove	Louis A. Withers	2,950,482	8/30/60
Shipping carton for wrap-around rear windows and windshields	Lloyd D. van Antwerpen	2,950,412	"
Carton construction	Packaging Corp. of America	2,950,850	"
Slide closure carton	Stanley L. Peimer	2,950,851	"
Folded container	Thomas B. Weiss	2,950,853	"
Carton	Continental Can Co. Inc.	2,950,854	"
Winding machine for paper	Black-Clawson Co.	2,950,875	"
Display carton	Westinghouse Electric Corp.	2,951,583	9/6/60
Produce container	Cornell Paperboard Products Co.	2,951,624	"
Box construction	Heinrich Envelope Co.	2,951,625	"
Box construction	Adolph Weiss	2,951,626	"
Snap top cardboard box	Cornell Paperboard Products Co.	2,951,627	"
Container for pourable material	Jean Grussen	2,951,628	"
Papermaking machine	Olin Mathieson Chemical Corp.	2,951,784	"

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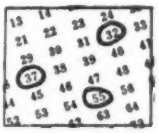

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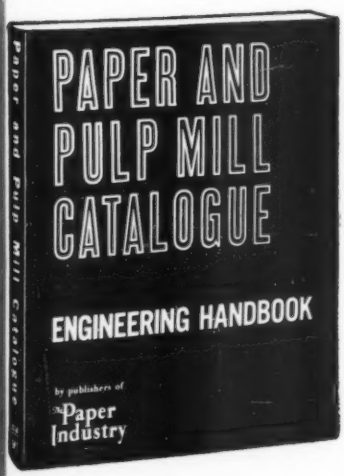

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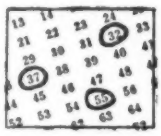

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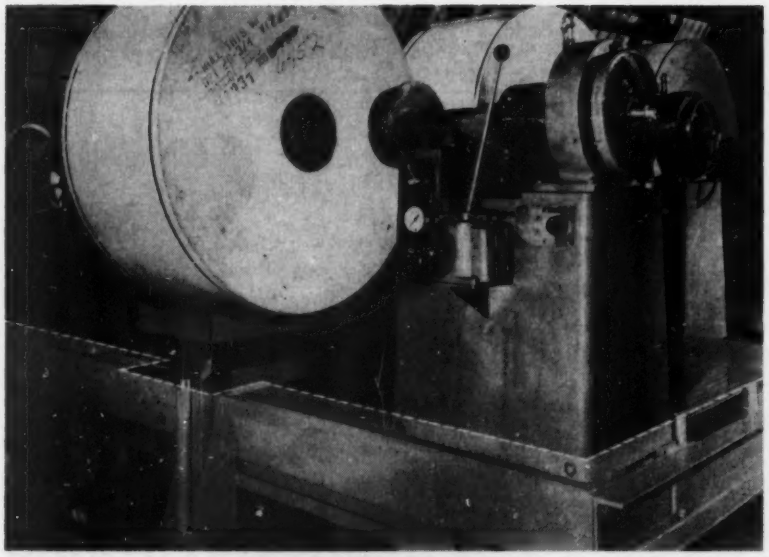

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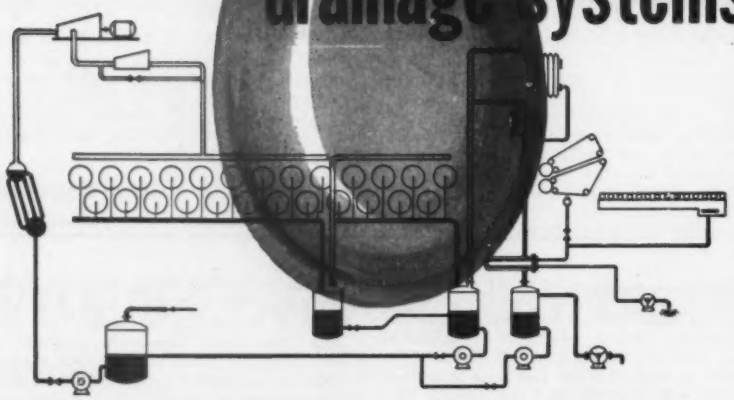

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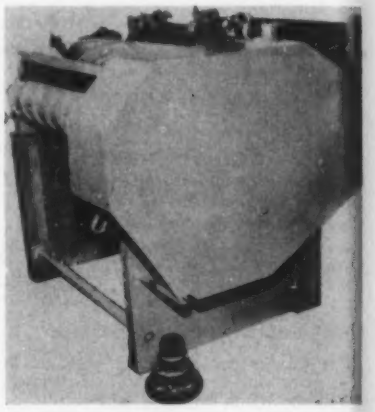
Our Dryer Drainage Systems will effectively eliminate your water condensate problems. Drying capacity is substantially increased and you get more effective drying at lower temperatures. In addition, RMF Systems result in more uniform drying across the sheet, assuring automatically graduated dryer temperatures. This lessens shrinkage, cracking, curling, wet streaks and hardening.

Send for Bulletin.

ROSS MIDWEST FULTON
A Division of Midland-Ross Corporation
Box 846, Dayton, Ohio

For more data circle 136 on Post Card



New cutter

Model MDS is a newly designed cutter which handles up to 100 in. wide rolls. The cutter features enclosed drive gears, readily accessible lubrication points and precision balanced rotating members. Ribbed construction adds strength and eliminates bulk to supporting structures. **Hamblet Machine Co.**

Circle No. 11 on Readers' Service Card

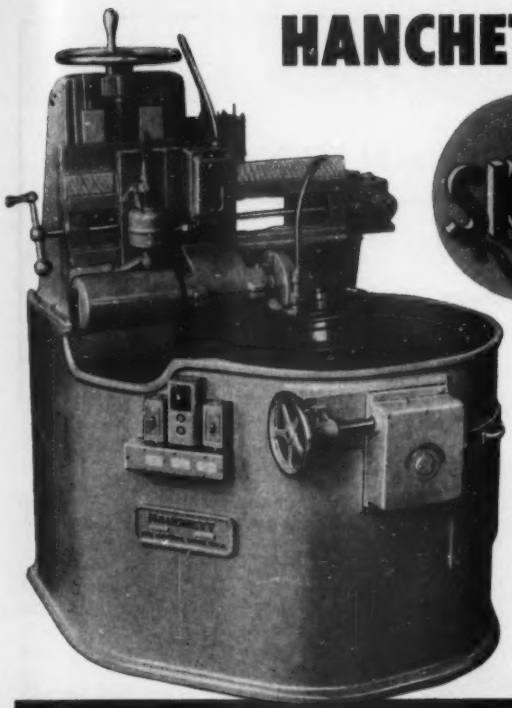
Storage cabinets

Multi-purpose storage cabinets in three new extra large sizes are now available. They are designed for safe, systematic storage of paper samples, paper and card stock. They are being offered in 5 drawer units and 10 to 15 drawer units with a base. **Foster Mfg. Co.**

Circle No. 12 on Readers' Service Card

Yellow dye

A direct dye for producing bright yellow shades on paper is now available as Stilbene Yellow 10 GP. It yields a bright greenish yellow of high tinctorial value for economical dyeing of a variety of sized papers. The dye is best applied in the beater to bleached chem-



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Top or Bottom SLITTER KNIVES
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Full Automatic or Semi-Automatic
Reasonably Priced

This Machine GUARANTEES:

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SHARP — CLEAN CUTTING KNIFE EDGES
LONGER MILL LIFE (less changes)
POSITIVE — ACCURATE FIXTURING
FINEST MICRO INCH FINISHES
CAPACITY — 2½" to 24" DIAMETER

Let us prove the value of this machine:
Send us your knives for test grinding.
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World's Largest Manufacturer of Knife Grinding and Saw Sharpening Machinery
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HANCHETT GRINDERS

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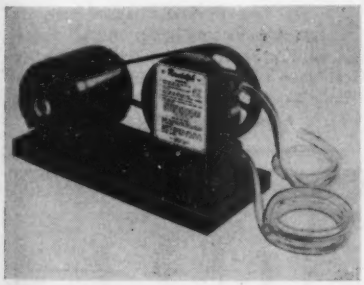
ical pulp. Dyeing of sized stock follows conventional methods in either batch or continuous application. **General Dyestuff Co., Division of General Aniline & Film Corp.**

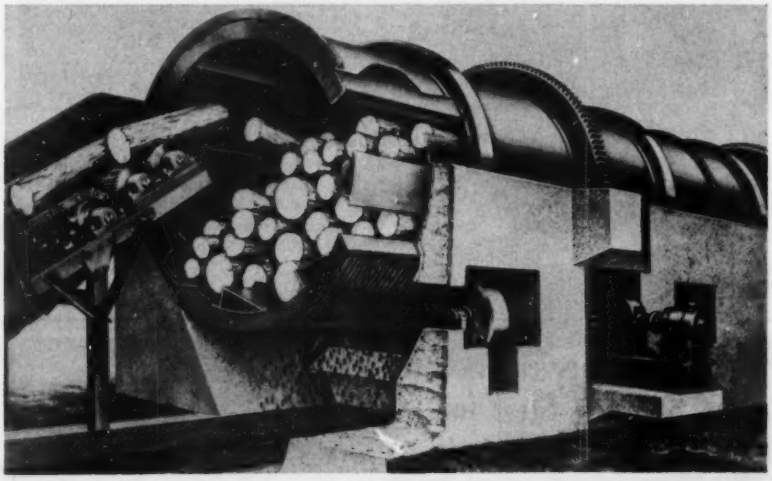
Circle No. 13 on Readers' Service Card



New pump

The Randolph pump operates on a principle designed to eliminate all contact of moving parts with the fluid being pumped. Intake and outlet are one continuous flexible tube which passes through the pump body where it is exposed to the action of ball-bearing rollers. A variety of corrosive, sterile, and abrasive liquids or gases can be pumped without contamination or injury to the pump. It comes in two sizes; 54 and 185 gal. per hr. **Randolph Co.**

Circle No. 14 on Readers' Service Card



Tunnel barker

The new tunnel barker represents a new concept in bark removal, utilizing the working parts of the conventional type trunnion barking drum, except that the revolving drum is replaced with an "open" scroll sweeping the circular tunnel that supports the logs. Barking action is principally by friction and impact against the concrete tunnel wall. Designed for barking commercial size pulpwood ranging from 4 to 10 ft. in length and 4 to 24 in. in diameter, the tunnel barker is 12 ft. in diameter by 48 ft. or 72 ft. long, depending upon the number of scroll sections. *D. J. Murray Mfg. Co.*

Circle No. 15 on Readers' Service Card

Knox Felts
KNOX WOOLEN COMPANY
CAMDEN, MAINE
America's First Manufacturer of Endless Paper Machine Felts

For more data circle 138 on Post Card

Flo-ball Valves

Eight six-in. Flo-Ball valves, in stock flow control operation for a year in pulp and paper mills, have eliminated dewatering and downtime due to piling of stock. This is prevented by a perfect seal; and pile-up of stock is eliminated by straight through flow. Easily installed, the valve need not be removed from the line for access to ball and seats. *Hydromatics Inc.*

Circle No. 16 on Readers' Service Card

Volumetric feeder

This volumetric feeder measures all free-flowing powdered, granular, or lumpy solids by volume, and has a maximum capacity of 3600 cu. ft. per hr. Models are available with 9- or 18-in. Buna-N feed belts. Feed rate is adjustable by a dial setting over a 10:1 range. Accuracy is maintained within ± 3 per cent over any one-minute period. Either size model can be converted to a gravimetric feeder by adding weighing components. *Wallace & Tiernan Inc.*

Circle No. 17 on Readers' Service Card

Pipe for conveying rolls

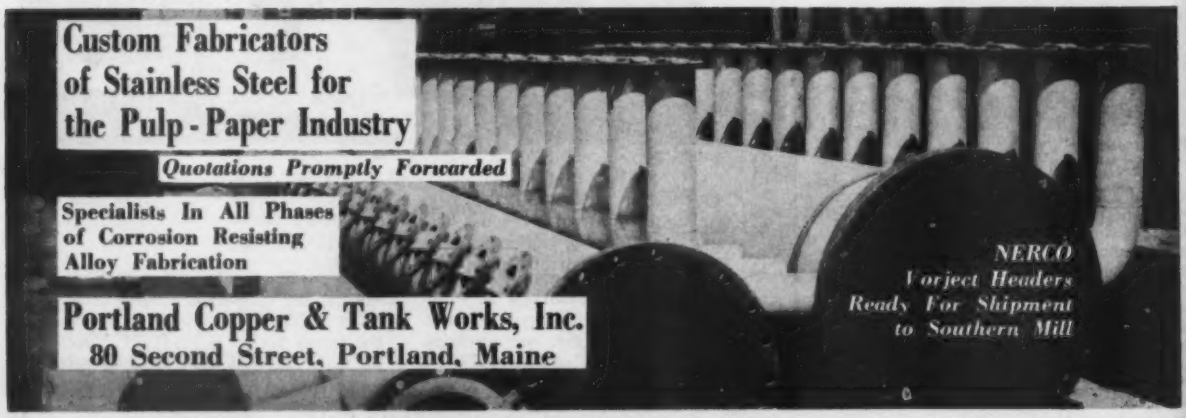
Conveying rolls are now being made of Byers PVC pipe which is shrunk onto ordinary steel tubing in the production of fourdrinier machine conveying rolls. Conveying rolls made by this process cause no whipping action damage to paper formation. *A. M. Byers Co.*

Circle No. 18 on Readers' Service Card

Variable speed belts

The new line of variable speed belts are available in sizes and types for all industrial applications. Top widths of standard sizes range from 7/8 to 3 in. and nominal overall lengths from 26.4 to 170 in. The

Continued on page 898



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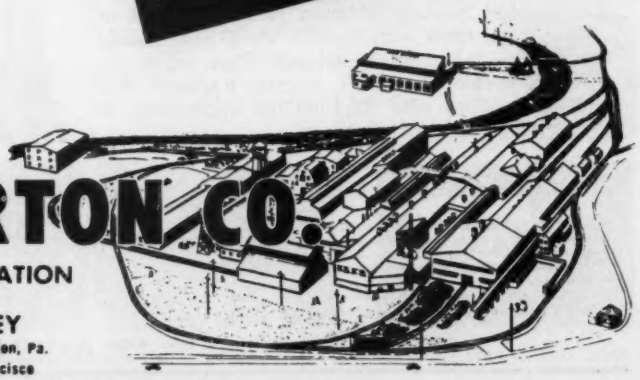
HOT OFF THE PRESS

Yours for the asking — a well illustrated 12 page catalog showing long wearing Tisco manganese steel products for the pulp, paper, and roofing industries. Clearly and concisely presented are features, specifications, sizes and valuable general information about Jordan Fillings, Shell Liners, Demountable Plug Sleeves, Solid Plugs, Bed Plates, Beater Rolls, Rotor Vane Segments for Pulpers, Sprockets and Traction Wheels, and Rotor and Stator castings for Breaker Traps. Write for your copy today.



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NEW PRODUCTS

Continued from page 896

belts are fabricated from fiber-reinforced synthetic rubber which is impervious to oil and heat and remains live under static conditions. Uniform notching on the underside provides ample flexibility without excessive strain or distortion on small pulley applications. *Lovejoy Flexible Coupling Co.*

Circle No. 19 on Readers' Service Card

Obliterating fluid

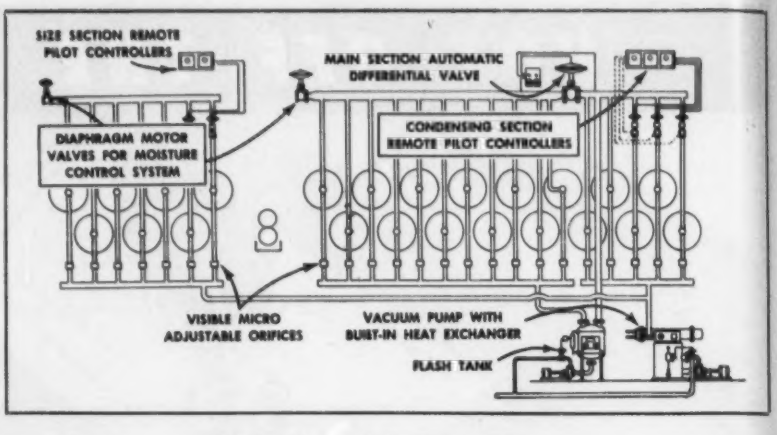
Stencil-Kover, an obliterating fluid, tan colored to match corrugated cartons, is used to cover old stenciling, labels and other printing. It dries rapidly allowing re-use of the containers. *Reynolds Ink Inc.*

Circle No. 20 on Readers' Service Card

Hydraulic log grapple

A new hydraulic log grapple, with ¼-cord capacity, handling 8-ft. pulpwood, is now available. Positive gripping action is exerted through use of two hydraulic cylinders. The entire grapple can be rotated 240° with both speed and accuracy. *Hydraulic Machinery Co.*

Circle No. 21 on Readers' Service Card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MAIN SECTION AUTOMATIC DIFFERENTIAL VALVE
DIAPHRAGM MOTOR VALVES FOR MOISTURE CONTROL SYSTEM
CONDENSING SECTION REMOTE PILOT CONTROLLERS
VISIBLE MICRO ADJUSTABLE ORIFICES
VACUUM PUMP WITH BUILT-IN HEAT EXCHANGER
FLASH TANK

Paper dryer drainage system

A new dryer drainage system, is designated as type 3. It is said to use fewer flash tanks, pumps, motors, controls, control valves and accessories than other systems. The system puts the drainage action of each dryer in a glass cage where it can be seen. It is designed for paper machines operating on medium and low pressures, and on vacuum. *Stickle Steam Specialties Co.*

Circle No. 22 on Readers' Service Card

Log stacker

An improved series FJ log stacker with electric powered tusk extensions, now has a 25 ton lift capacity. All structural components are built from heavy nickel-chrome alloy steel to give added strength. The mast structure has been reinforced and the car structure has a new wrap-around design. Other improvements include demountable tusks and an independently operated cable kicker that removes all the logs from the forks. *R. G. LeTourneau Inc.*

Circle No. 23 on Readers' Service Card

INSTALL *OVERLY* VEE-GRIPS IN YOUR STOCK LINES

- **A tight seal in seconds.**
- **Pipe is held in perfect alignment.**
- **Weigh less and cost no more than ordinary back-up flanges.**
- **Available for 3", 4", 6", 8" and 10" tube and pipe.**

Save time! Replace ordinary back-up flanges in your stock lines with Overly Vee-Grips! Easily put on or taken off in seconds. Pipe joints are held in perfect alignment, assuring a smooth flow of stock. They also improve the appearance of your stock line installations.

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OVERLY'S INCORPORATED

Box 468 Neenah Wisconsin

For more data circle 141 on Post Card

New head cutter

The paper head cutter consists of a bandsaw and a foot-controlled, air-operated pivot clamp, which enables the operator to cut heads from stacks up to 6 in. thick. It will cut diameters of from 6¾ in. up. The cutter itself requires from 30 to 50 sq. ft. of floor space. 60 psi air supply is required. *Lamb-Grays Harbor Co.*

Circle No. 24 on Readers' Service Card

. . . WITH EVERY SWENSON INSTALLATION!

You buy more than precisely fabricated metal whenever you invest in a Swenson Evaporator, Crystallizer, Dryer, Filter or Pulp Washer. You also purchase the close, personal interest of your Swenson engineer.

Swenson engineering integrity demands meticulous preliminary planning, insists on pre-installation testing and oversees every phase of installation. Your Swenson engineer makes post-installation checks, too, assuring the continuous control of processing and production that has made "Swenson" synonymous with profitable, trouble-free operation.

For experienced consultation—and accurate cost studies—you'll find a Swenson engineer at the other end of your phone.

SOMETHING YOU CAN USE!

Ask for Bulletin SW 205—*FORCED CIRCULATION EVAPORATORS*—eight-page treatise on salting and non-salting types, single and multiple effects. *Swenson Evaporator Company, 15653 Lathrop Ave., Harvey, Illinois. In Canada: Whiting Corporation (Canada) Ltd., 350 Alexander Street, Welland, Ontario, Canada.*

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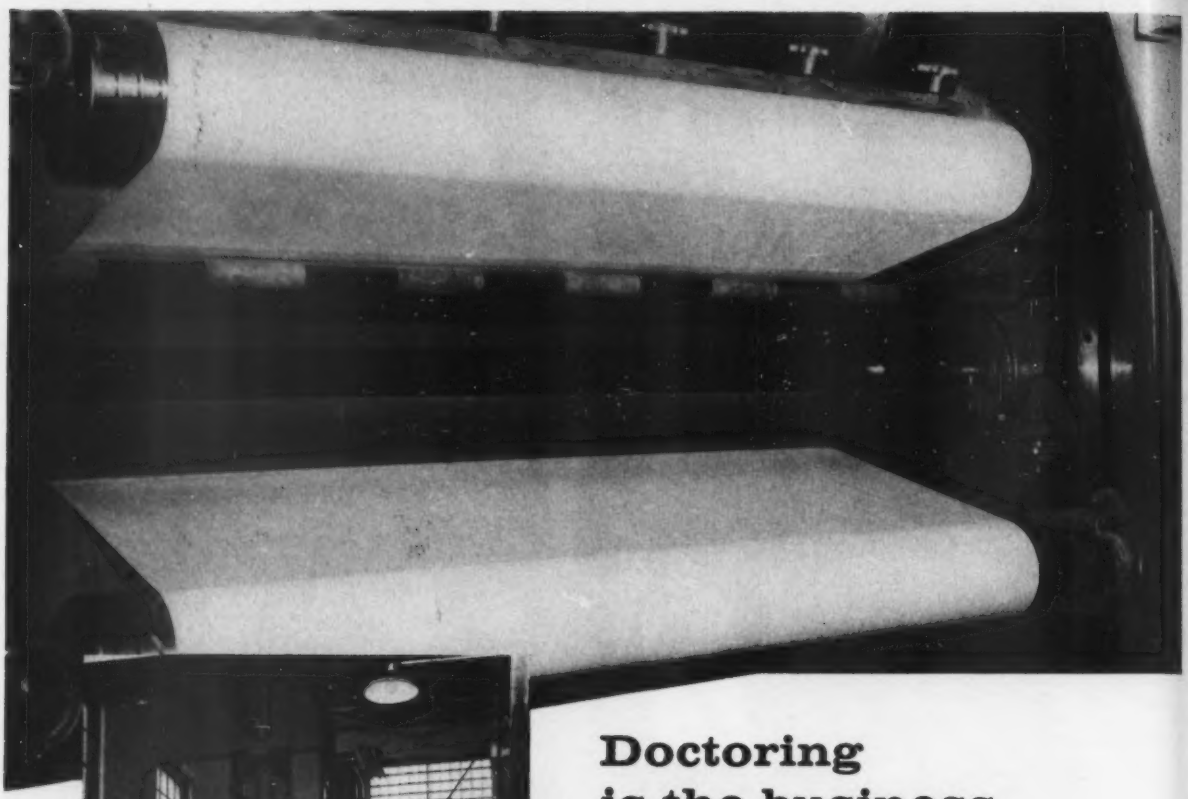

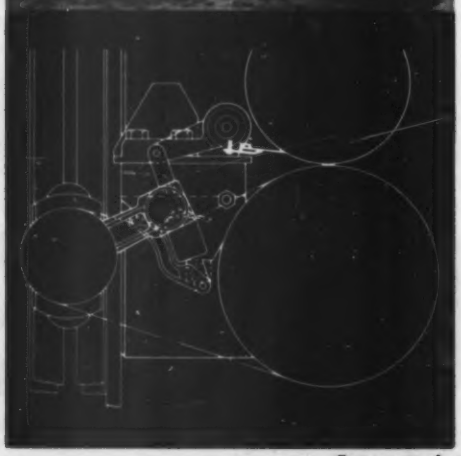

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It was through just such a combination of engineering and manufacturing skills that the first successful installation of doctors was made on a supercalender running inked, waxing stock. It took place in 1948 at the Badger Paper Mills.

Ever since, these same Lodding Doctors, custom designed for the Appleton Machine Company, have had a notable record of performance keeping the rolls clean and shiny. The supercalender was engineered to apply 2000 lbs. per lineal inch nip pressure at the bottom nip, while operating at speeds up to 1600 fpm.

They were among the first doctors to be equipped with multiple station hydraulic oscillation. Now, with wider and faster machines, the importance of calling on specialists to solve doctoring problems increases. Lodding is always ready to accept any doctoring assignment, no matter how difficult, in cooperation with the machine builder or directly with the papermaker.

When you want excellence in doctor performance, specify Lodding.

LODDING
Engineering Corporation
AUBURN, MASSACHUSETTS

For more data circle 143 on Post Card

Books

CHEMISTRY OF PLANT GUMS AND MUCILAGES, by F. Smith, Professor, Institute of Agriculture, University of Minnesota; and R. Montgomery, Assoc. Professor, Dept. of Biochemistry, University of Iowa. Published by Reinhold Publishing Corp., New York, 499 pp.

Everything that is known of the chemistry of these versatile substances is presented in this comprehensive new monograph. This includes the rapid strides made in the last few years. The purpose of the book is two-fold: to evaluate critically the progress made in this field, and to encourage new ideas for the industrial application of gums. The treatment of the subject is exhaustive, and begins with gum function and origin. The gums are classified botanically before the text takes up their chemical and physical properties.

HANDBOOK OF FILTRATION, Written and Published by The Eaton-Dikeman Co., Mt. Holly Springs, Pa. $2.50. Reviewed in this Handbook are the latest data covering the general area of paper filtration. Particular emphasis has been placed on the mechanisms of retention and filter paper permeability.

General subjects covered are historical aspects of filtration, test methods for filter paper, retention, theoretical and practical aspects of permeability, laboratory filtration and industrial filtration.

The Handbook is designed for use as a college reference book and for use by laboratory technicians and process engineers.

FOREST AND SHADE TREE ENTOMOLOGY, by Roger F. Anderson, professor of forest entomology at the School of Forestry of Duke University. Published by John Wiley & Sons Inc., 440 Fourth Ave., New York 16, N.Y. Pages: 428. Price: $8.50.

The author of this book attempts to give the reader a fundamental understanding of insect life, as well as prepare him to deal with actual forest insect problems. Section I presents the fundamental principles of insect physiology, classification, and ecology, also setting forth the basic principles involved in the choice and application of insecticides for forest insect surveys.

Section II offers detailed discussion and description of important insect species. This section is designed to enable the reader to identify insect-types readily through examination of tree damage. The work contains many valuable identification aids: written descriptions, photographs, line-drawings, and tables.

USDA Reports

THE FOLLOWING RESEARCH NOTES are obtainable from the Southeastern Forest Experiment Station, Asheville, N.C.: No. 147, Grading Yellow-Poplar Planting Stock Is Important; No. 148, Time-Temperature Relationships of Test Head Fires and Backfires; No. 149, Fuel Weights of Pond Pine Crowns.

OBTAINABLE from the Lake States Forest Experiment Station, U.S. Dept. of Agriculture, University of Minnesota, St. Paul 1, Minn., are the following Technical Notes: No. 587, High Growth Rate Maintained by 140-Year-Old Red Pine; No. 58, Lake States Pulpwood Production Exceeds 3 Million Cords, 1959; No. 589, Five-Year Results of a Growing-Stock Density Study in 85-Year-Old White Pine.

Manufacturers' Publications

Copies of these publications are available at no obligation through our Readers' Service Department. Use the reply card which accompanies this issue when requesting items.

High cost of stuffing box leakage

Lapp Insulator Co., Process Equipment Division, is offering a new brochure on "Profits Down the Drain". A chart illustrates daily and yearly leakage costs based on the value of the liquid metered. Methods of overcoming cost problems of drainage, maintenance, and loss of accuracy are discussed. Data on metering units with leak-proof design is also included.

Circle No. 25 on Readers' Service Card

Couplings

Falk Corp. is issuing a revised bulletin on steelflex couplings. New pages, additional coupling types, more sizes, and easier methods of selection have been added to the bulletin.

Circle No. 26 on Readers' Service Card

Petrothene resin

U. S. Industrial Chemicals Co. has published a four-page data sheet listing the most commonly-used Petrothene polyethylene resins, their main characteristics, and their predominant applications. Several of the many available compounded resins are listed also. This data sheet is meant to serve as a general guide, and is not a listing of all Petrothene polyethylene resins or all possible applications.

Circle No. 27 on Readers' Service Card

Ball joints

Barco Mfg. Co. has published a catalog illustrating the five basic motion principles of the ball joints. Actual installations are shown and explained. Sections of the catalog cover ball joints in sizes from 1/4 to 16 in. with threaded, flanged or welding end connections and joints for high temperatures and pressures.

Circle No. 28 on Readers' Service Card

Flowmeter

Fischer & Porter Co. is offering a bulletin on their armored, glass tube, variable-area indicating flowmeter designed for high pressure and temperature service. The bulletin indicates dimension, capacities, performance and accessories.

Circle No. 29 on Readers' Service Card

Rotary compressor

Fairbanks-Morse & Co. has published a bulletin describing a new heavy-duty rotary compressor for general purpose services. Performance characteristics, range of frame sizes, applications, design and construction, installation and performance ranges charts, are given.

Circle No. 30 on Readers' Service Card

Low-voltage distribution equipment

General Electric Co. is announcing the release of its latest 92-page catalog covering low-voltage distribution equipment. The publication is issued jointly by G.E.'s Distribution Assemblies Dept. and Circuit Protective Devices Dept. Designed to serve as a condensed buying catalog for products of the two departments, it includes product selector charts, descriptions, consolidated pricing tables, and a catalog number index. Also included are ratings, weights, dimensions, standard package quantities, ordering directions and general application information.

Circle No. 31 on Readers' Service Card

Exhaust head

Industrial Products Group of Crane Co. is making available literature on exhaust heads. The heads, which are designed to remove impurities from exhaust steam, are constructed of cast iron.

Circle No. 32 on Readers' Service Card

Optical paper inspection equipment

Radio Corp. of America is offering a catalog describing their optical paper inspection machine. Specifications, performance capabilities, operating principle and application are given.

Circle No. 33 on Readers' Service Card

Gearmotors and speed reducers

Howell Electric Motors Co. is making available a 6-page bulletin on their line of gearmotors and Line-O-Drive coupled speed reducers. In addition to descriptive and performance data, two pages of selection tables

FLIPPING the LINT OFF "FLIP-TOPS"

Jenkins' METLKOR Web Cleaning Brush of DuPont Tynex Nylon

The gravure production plant of the Downingtown Paper Box Company, Downingtown, Pennsylvania is an engineering triumph. Here, Marlboro "flip-tops" are produced on Champlain presses at speeds up to 2400 cartons per minute.

HERE'S WHAT THE DOWNINGTOWN PAPER BOX COMPANY SAYS: Mr. George J. Wolfer, Gravure Supt. says: "Jenkins' METLKOR brushes are contributing to the overall economy and quality that is so important to our production. When we reorder brushes, they will be Jenkins' METLKORS."

HERE'S WHAT THE MANUFACTURERS OF THE CHAMPLAIN INLINE GRAVURE EQUIPMENT, OF HARRISON AVENUE, ROSELAND, N.J., SAY: "The Jenkins' METLKOR brushes used in the web cleaning process of our Champlain inline gravure equipment are superior in performance and efficiency and are providing satisfactory and economical operation for our customers all over the world."

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Dampener Roll Cleaning • Cylinder, hold down • Web Cleaning • Dusting • Removal of anti-offset powder • Feed. PAPER MILL BRUSHES: Conveyor Cleaning • Blanket Washer • Fourdrinier Wire Cleaning • Polishing • Coating • Dusting • Dampening • Spray • Sieve • Feed or Carrier • Static Elimination • Flocking • Felt Cleaning • Paint Brushes • Floor Sweeps • Void Detector

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the original . . . the best *Metal Core* brush

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For more data circle 144 on Post Card

tabulate various output speeds for each horsepower rating. The bulletin lists numerous typical applications but points out that uses are for any drive requiring slower-than-motor speeds.

Circle No. 34 on Readers' Service Card

Stored energy switchgear

I-T-E- Circuit Breaker Co. has published a bulletin describing the line of 4160-volt metal-clad switchgear. The two-color 20-page bulletin gives comprehensive information on the complete line of indoor and outdoor equipment. Illustrated with photographs, sketches, diagrams and drawings, the bulletin includes charts and tables for detail engineering information.

Circle No. 35 on Readers' Service Card

Air compressors

Clark Bros. Co. has issued a bulletin on packaged air compressors for individual applications. Fully described and illustrated are all important features including compact design, two-stage compression, air cooling, etc. Longitudinal and transverse cross sections with callouts highlight important construction features.

Circle No. 36 on Readers' Service Card

Glassed-metal pipe

Pfaudler Co. is making available a 16-page bulletin describing a glassed-metal pipe, valves and fittings. The bulletin presents a short introductory paragraph on the need for glassed-metal pipe, and contains cut-away drawings, and complete specifications and dimensions for all of the components discussed.

Circle No. 37 on Readers' Service Card

Surfactants

Onyx Chemical Corp. is announcing the availabilty of a bulletin listing the most recent line of products. These products, surfactants and specialty products, are listed along with their chemical and physical descriptions. Specific applications and general use suggestions are also included.

Circle No. 38 on Readers' Service Card

Graphite centrifugal pumps

National Carbon Co. is offering a four-page bulletin on Karbate impervious graphite type F centrifugal pumps. A cut-away drawing clearly illustrates the features of the new carbon-to-carbon rotary seal. A dimension sketch and table present all dimensions of the 20 available models of the motor-mounted pumps.

Circle No. 39 on Readers' Service Card

Analyses for tubing and pipe

Babcock & Wilcox Co. has published a bulletin on analyses for tubing and pipe for corrosion resistant service or elevated temperature and pressure service. It shows the chemical analyses of the standard carbon, alloy and stainless tubing steels and is cross-indexed to associate grade and ASTM specifications with B&W's Nicloy, Croloy and specialty tubing steels. The bulletin also lists the ASTM tubing and pipe specifications by number and title.

Circle No. 40 on Readers' Service Card

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Lindsay Wires
Knox Woolen Felts
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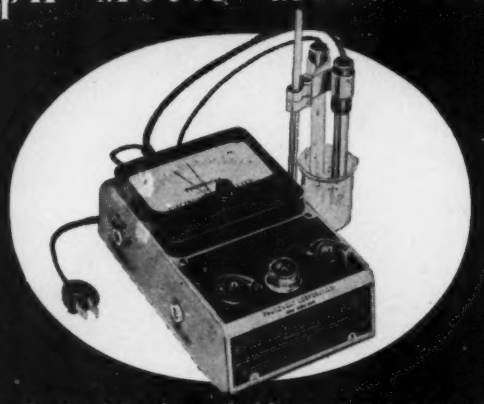

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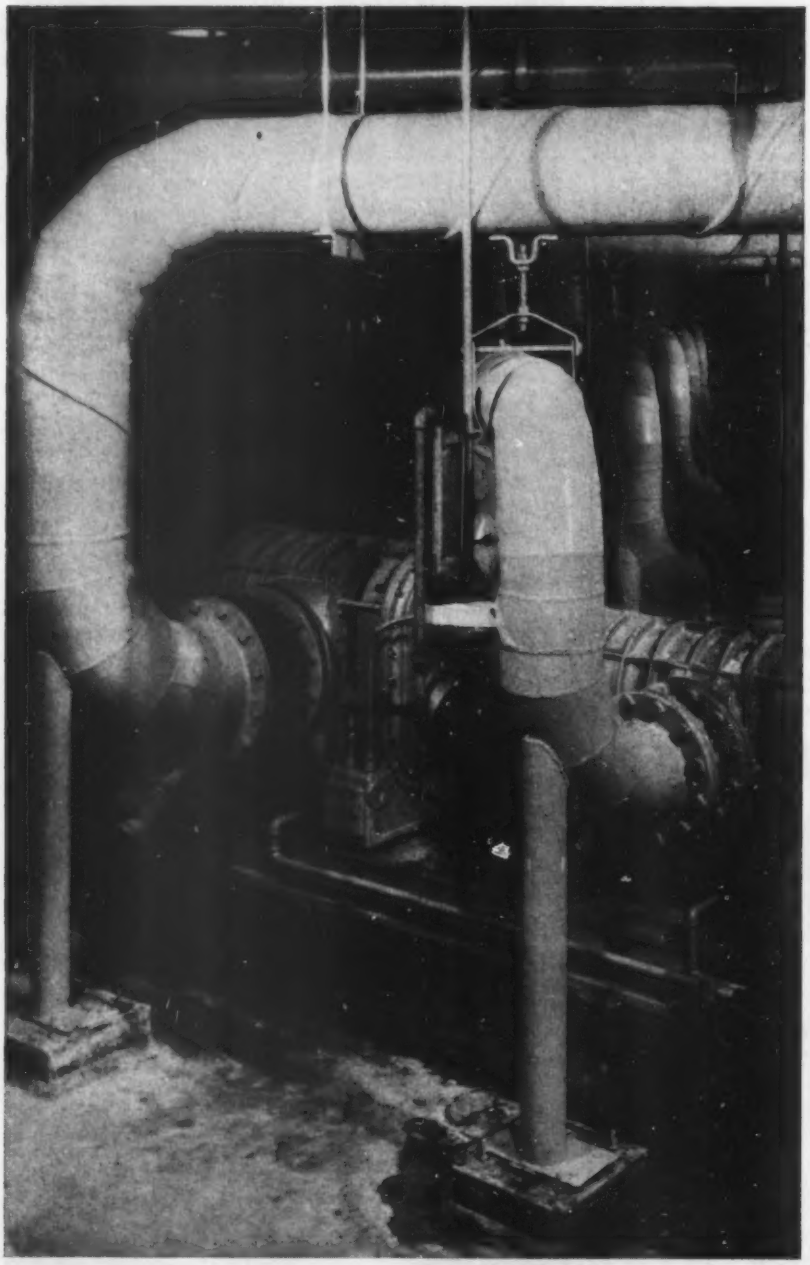

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RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.o.b. New York:

	per cwt.
No. 1 white shirt cuttings	10.00— 10.50
Soft unbleached muslins	13.50— 14.00
Fancy shirt cuttings	2.00— 3.00
No. 1 percales	4.00— 5.00
No. 1 washables	2.00— 2.25
No. 1 light silesias	6.50— 7.00
No. 1 light prints	3.00— 4.00
Light flannelettes	5.50— 6.00
Cottonades	2.25— 2.50
Blue overall cuttings	5.00— 5.50
Blue cheviots	6.75— 7.25
Canton flannels, bleached	10.50— 11.00
Canton flannels, unbleached	10.50— 11.00
Osnaburg cuttings	8.50— 9.00
Underwear cuts, bleached	10.50— 11.00
Underwear cuts, unbleached	10.50— 11.00
Sun tan khaki cuttings	5.00— 5.50
America linen cuttings	6.75— 7.25

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York.

	per cwt.
No. 1 roofing (Chicago)	.50— .55
No. 2 roofing (Chicago)	.40— .45
Twos and blues, repacked	2.00— 2.25
Thirds and blues, repacked	1.50— 1.75
No. 1 whites, repacked	—
No. 1 whites miscellaneous	—
No. 2 whites, repacked	—
No. 2 whites, miscellaneous	—

RAGS (Foreign)

(ex dock New York City)

New Rags

	per cwt.
New dark cuttings	Nominal
New mixed cuttings	
New light silesias	
Light flannelettes	
Unbleached cuttings	
New white cuttings	
New light oxfords	
New light prints	

Old Rags

	per cwt.
No. 1 white linens	Nominal
No. 2 white linens	
No. 3 white linens	
No. 4 white linens	
No. 1 white cottons	
No. 2 white cottons	
No. 3 white cottons	
No. 4 white cottons	
Extra light prints	
Ordinary light prints	
Medium light prints	
Dutch blue cottons	
French blue cottons	
French blue linens	
Checks and blues	
Linsey garments	
Dark cottons	
Old shopperies	

ROPE and BAGGING

f.o.b. and ex dock New York City

Gunny No. 1, domestic	—
Gunny No. 1, foreign	—
No. 1 manila rope, domestic	—
No. 1 manila rope, foreign	—
New burlap cuts (soft)	—
Sisal strings	—
Mixed strings	—

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	85.00— 90.00
No. 1 hard white shavings	70.00— 75.00
No. 1 soft white shavings	45.00— 50.00
Soft white shavings, uncoated	55.00— 60.00
Fly leaf shavings No. 1	17.00— 22.00
Fly leaf, woody, No. 1	17.00— 20.00
Mixed colored shavings	16.00— 18.00
No. 1 books and magazines	13.00— 15.00
Ledger stock, white, No. 1	40.00— 45.00
Ledger stock colored, No. 1 (Midwest ship)	30.00— 32.50
New manila envelope cuttings (free of groundwood)	50.00— 55.00
New manila envelope cuttings (containing groundwood)	40.00— 45.00
Manila tab cards	50.00— 55.00
Colored tab cards	40.00— 42.50
New northern kraft envelope cuttings	50.00— 55.00
Triple sorted kraft, 100%	30.00— 32.50
No. 1 old kraft	22.50—
White news cuts, No. 1	40.00— 45.00
No. 1 overissue news	17.00— 19.00
Folded news, special	14.00— 15.00
Folded news, ordinary	12.00— 13.00
Old corrugated boxes	15.00— 16.00
New jute corrugated cuts	19.00— 20.00
Mill wrappers	9.00— 11.00
Boxboard cuttings	2.00— 3.00
No. 1 mixed paper	1.00— 4.00

CHEMICALS

F.o.b. New York City

Alum, ammonium	
Granular, bags, works, cwt.	4.30—
Lump, drums, works, cwt.	5.05—
Powdered, drums, works, cwt.	5.20—
1-Arginine, drums, kilo	90.00—
Blanc Fixe	
Direct process, bags, c.l., works, ton	160.00—
L. c. l., ton	170.00—
Bleaching Powder, drums, cwt.	—
Casein, domestic acid precipitated	
30-mesh bags, 10 000-lb. lots or more, shipping point, lb.	.56—
80-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.64—
China Clay, domestic dry-ground, airfloat, 99%	
325-mesh bags, c.l., Georgia works, ton	11.00— 17.00
300-mesh bags, c.l., Georgia works, ton	13.50— 22.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross ton	23.00— 35.00
Chlorine, liquid	
Tanks, single units, works, freight equaled, cwt.	3.25—
Glycerine, refined (CP, USP) 99%, drums c. l., delivered lb.	.28⅞—
Litharge, commercial powdered	
Barrels, c. l., works, freight equaled lb.	.13¼—
Rosin, gum, c. l., f.o.b. New York, cwt.	
K, M	15.75—
N	16.00—
WG	17.00—
WW	17.50—
Rosin, wood, c. l., f.o.b., shipping point, cwt.	
K, M	12.00— 15.25
N	12.35— 15.60
WG	12.55— 15.85
WW	12.85— 16.25
Saltcake, domestic, bulk works, 100% Na_2SO_4 basis ton	28.00—
Soda Ash	
Dense, 58%, paper bags, c.l. works, cwt	1.90—
Light, 58%, paper bags, c.l. works, cwt	1.85—
Soda, caustic	
Flake, 76%, drums, c. l. works, freight equalled, cwt	5.20—
Solid, 76%, drums, c. l. works, cwt.	4.80—
Sodium Silicate	
40°Be, 1:3.2, turbid, drums, c. l., works, cwt.	1.65—
52°Be, turbid, 1:2.4, drums, c. l., works, cwt.	2.65—
Starch	
Pearl, 140-lb. bags, cwt.	6.73—
Pearl, 100-lb. bags, cwt.	6.58—
Powdered, 100-lb. paper bags, cwt.	6.78—
Sulfur, crude	
Bulk, c. l. mine, contract, long ton	23.50—
Talc	
Domestic, fibrous, N. Y., grd., bags, c. l. works, ton	28.00—
Canadian, ground, bags, c. l. works, ton	20.00— 35.00
Titanium Pigment	
Calcium-rutile base, regular, bags, c. l., lb.	.09⅜—
High-tinting, drums, c. l., lb.	.14⅜—
Zinc Oxide Pigment, American process	
Lead-free, bags, c. l. freight allowed, lb.	.12½—
Leaded, 35%, bags, c. l., freight allowed, lb.	13⅜—

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	140.00—
Bleached sulfite, Canadian	140.00—
Unbleached sulfite	—
Unbleached sulfite, Canadian	135 00—
Bleached soda	135.00—140.00
Bleached soda, Canadian	135.00—140.00
Kraft, bleached hardwood	135.00—140.00
Kraft, bleached	145.00—150.00
Kraft, bleached southern	135.00—140.00
Kraft, bleached Canadian	150.00—
Kraft, unbleached southern	120.00—
Kraft, unbleached, Far West	125.00—
Kraft, unbleached Canadian eastern	135.00—
Kraft, unbleached Canadian western	120.00—125.00
Kraft, semi-bleached southern	130.00—
Sulfite screenings	—
Sulfate screenings	—

Quotations on imported wood pulp dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite Swedish, freight allowed	140.00—
Bleached sulfite, Norwegian, del'd with limited freight allowance	140.00—
Bleached sulfite, Finnish, freight allowed	155.00—
Unbleached sulfite, Swedish, freight allowed	135.00—
Unbleached sulfite, Finnish, freight allowed	135.00—
Kraft, unbleached, Swedish, freight allowed	125.00—
Kraft, unbleached, Finnish, freight allowed	125.00—
Kraft, bleached, Swedish, on dock	157.50—162.50
Kraft, bleached, Norwegian	155.00—

PAPER

Quotations are mill quotations Chicago

Boards (prices per ton, delivered in Chicago, 10 tons or more):	
Plain chip	
News vat lined chip	
.009 chip, rolls	
Filled news	
Solid news	
White vat lined chip	
Chip tube and can stock	
Single manila lined chip	
Single jute lined chip	
Container, 42-lb.	
Kraft liner (per 1000 sq. ft.)	
White patent coated	
.020	
.018	
.016	
Book Paper (f.o.b. Chicago, c.l. skids per cwt):	
No. 1 enamels	20.80
No. 2 enamels	19.80
Machine-coated, 45- to 100-lb.	15.55— 19.00
60-lb. + uncoated offset, 25 × 38 (2000 lb.)	22.25
"A" grade English finish untrimmed, 25 × 38 (2000 lb.)	21.10
Rag Content Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	per cwt
100% rag	—
75% "	—
50% "	—
25% "	—
Rag Content Ledger (white, 5000 to 10,000 lb., ream sealed cartons):	
100% rag	—
75% "	—
50% "	—
25% "	—
Sulfite Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	
No. 1	—
No. 2	—
No. 4	—
Sulfite Ledger (white, 5000 to 10,000-lb., ream sealed cartons):	
No. 1	—
No. 2	—
No. 4	—
Newsprint (contract base price)	per ton
Rolls, standard	135.00
Sheets	Standard differentials
Kraft Wrapping — Natural (standard rolls 9- and 15-in. diam.)	per cwt
70-lb. and heavier	9.00
60-lb	9.25
50-lb.	9.50
40-lb.	9.75
35-lb.	10.25
30-lb.	11.00
25-lb.	11.75
20-lb.	12.75
No. 1 Kraft Butcher — Pink	per cwt
40-lb. only	10.50
(Sheets — Plus 50c cwt)	

FOREIGN ABSTRACTS

Continued from page 891

Use of "booster" heating on papermachines

The theory of heat transfer and of forced convection are discussed. In the paper, board and wall board industries the following types of heaters may be used: infra-red radiant electric heaters, radiant gas heaters, conductive heaters, flame-heated air heaters, and the Lippke type electrical conductive heating press. The Australian Paper Manufacturers Ltd., in their Fairfield and Botany mills, installed infra red radiant electric heaters, and a forced convection type gas heater was introduced in their Melbourne mill. Details are given of the installations as well as the results on production rates. In producing chip and filler board, the average increase, after the installation of the forced convection type gas heater, ranged from 4.3 to 11 per cent. Apparently booster heating may serve as a means of increasing machine capacity without interrupted production or costly installations. The costs of running the gas heater and of gas and "liquid petroleum gas" and certain insurance problems are outlined.

M. R. Pallavicini. **APPITA** 14, No 3, 88-105, discussion 105-7 (1960).

Studies of table roll drainage

Using the laboratory paper machine in the Central Laboratory of the Swedish Paper Mills, studies were carried out with kraft and newsprint stock, operating at 200, 300, 375 and 410 meters per minute. The results indicated that the drainage (q) could be described by the formula: $q = (2r/F^a) \cdot U^a$, in which r = the radius of the table roll; a (for kraft stock) = 0.3; a (for newsprint stock) = 1.2; and F = the filtration factor. These values for a were calculated from experimental data in such a way that the value of the filtration factor remained independent of the wire speed.

In each of the test runs the filtration factor was calculated from the table roll flows. The following are discussed: the effects on the filtration factor caused by the sheet formation, the basis weight of the fiber mat, the wire speed and the design of the wire, and finally the effects of the slowness and the concentration of the stock. The filtration factor is not a constant, but a parameter, depending on the properties of the pulp stock and the fiber mat formed on the wire. The present study showed that the effect of wire speed on the flow from the table rolls was different for different types of stock, and this may be due to a difference in compression of the fiber mat on the wire. The compressibility for the kraft furnish was relatively large and resulted in a small influence of the wire speed on the drainage. For a stock of this type, the basis weight of the fiber mat and the slowness are primarily instrumental in determining the magnitude of the drainage. In the case of the newsprint, the drainage appeared to depend more on the wire speed than it did in the case of the kraft. The present study was limited to factors

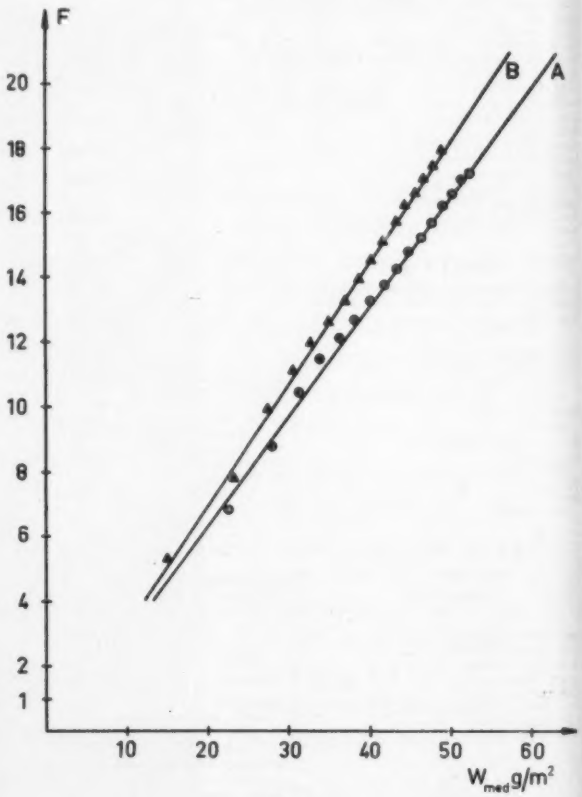

Fig. 3

that could be easily measured and defined. Actually the drainage process is complicated by conditions which at present have simply been discussed. Among these are changes in the process of sheet formation and the properties of the fiber mat resulting from such changes, discharge conditions at the headbox and the amount of water carried on the wire, and also on the design of the wire. The difficulties in attempting to establish definite mathematical relations between all factors governing drainage at the table rolls became apparent. Operating differences in different papermachines, or from one experimental set-up to another give rise to unknown elements. If one adheres to one type of machine, operating on a specific type of stock, it is possible to use the data, and there may be some measure of success in predicting the effect of a proposed change in machine construction. A number of graphs show various relationships between the filtration factor and other variables. For example, Fig. 3 shows the filtration factor (**F**) versus basis weight of the fiber mat at a machine speed of 200 meters per min., at 60 deg. Schopper Riegler, using a consistency of 5 g. per liter, and a basis weight of 60 g. per sq. meter. In graph A, the apron was pulled in; in B it was let out.

Arne Tellvik and Otto Brauns. **Svensk Papperstidn.** 63, 803-812 (1960) (In English).

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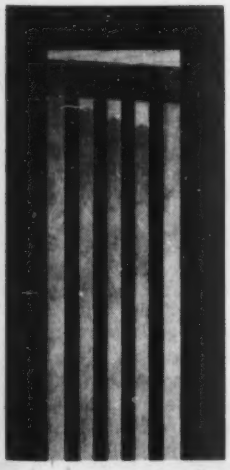

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Organic chelating agents stabilize peroxide liquors

Heavy-metal-ion-catalyzed decomposition of peroxide in alkaline peroxide solutions can be prevented with the use of organic chelating compounds of the aminopolycarboxylate type, it was reported by R. D. Spitz of Dow Chemical Co. at the 46th Tappi Meeting.

Penta-sodium diethylenetriaminepentaacetate (Na_5DTPA) appeared to be the most effective among the commercially available chelating agents of this group. Groundwoop pulp pretreated with Na_5DTPA (at the rate of 5-10 lbs/ton of o.d. pulp), prior to thickening and bleaching, showed a brightness increase of 2-3 G.E. units compared with conventionally peroxide-bleached pulp.

Newsprint from 100 per cent bagasse

A new plant will be built at Karad, India, for the purpose of manufacturing newsprint entirely from bagasse. The plant will manufacture finely ground, depithed bagasse to be used, initially with chemically pulped wood, and later with chemically pulped bagasse in newsprint production.

The process, developed jointly by Crown Zellerbach and Hawaiian Sugar Planters Assn., presents a solution to the problem of translucency and resistance to printing inks exhibited by chemically pulped bagasse fibers, unless blended with wood pulp or used with large quantities of mineral fillers. It involves grinding the depithed bagasse to a powder, fine enough that only 12 per cent of it is retained on a 100-mesh screen. The powder is then bleached and blended in various proportions with chemically pulped bagasse, kraft of hardwood pulps. Newsprint has been prepared from 100 per cent bagasse pulp that is identical in quality with newsprint prepared from softwood pulps.

Mono-Rail pulpwood transporter

The Mono-Rail transporter is a power-wagon and trailer which carries a load of 1-1½ tons of pulpwood and travels unattended along a single line of rail. It is stopped automatically at any predetermined place.

The rail, consisting of 12 ft. long sections, can be easily laid by two men. With an overall width of 4 ft. the Mono-Rail System is suitable for use along narrow rides.

Ship launched to transport molten sulfur

Texas Gulf Sulphur Co. has launched a ship specially designed to transport molten sulfur from Texas to two molten sulfur terminals located at Carteret, N. J., and Norfolk, Va. Texas Gulf estimates that, by the end of 1961, about 40 per cent of its 2,000,000-ton output will be transported in molten form. Molten form transportation offers such advantages as more efficient materials handling, reduction of wind losses and contamination associated with bulk dry-storage, and more efficient inventory control.

Forest genetics in action

The practice of cutting the best trees and leaving the poorest and culls to produce seed for coming generations of timber has resulted in degeneration of timber quality in many areas, according to Dr. Bruce J. Zobel, professor of forest genetics at North Carolina State College.

To reverse the trend, 150 million superior pine trees (obtained from very few selected trees) are now planted annually on previously mismanaged holdings and reclaimed lands in the Southeastern States. This is done by planting seed on sites prepared by first destroying all low-quality vegetation.

Germ-proof paper

A new type of grem-proof paper has been developed by the Soviet Paper Industry Research Institute. The paper is claimed to be firm, not to decompose, to be suitable for use in subtropical areas, and to preserve temperature and humidity of the article wrapped in it.

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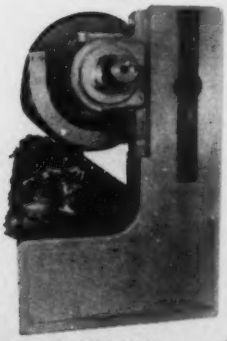
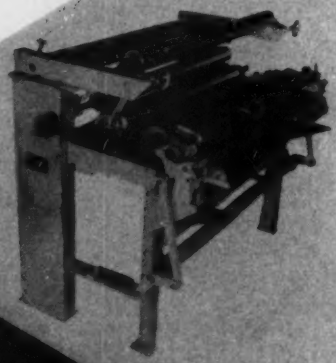
Black-Clawson offers the experience gained from engineering and building a complete line of clay coaters designed to meet practically any application, on or off the paper machine . . . the experience gained from scores of installations in operation on a wide variety of grades.

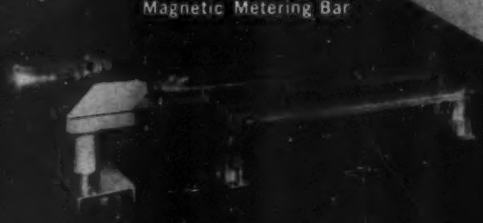
When considering clay coating equipment, talk to Black-Clawson's Dilts Division at Fulton, New York. Write for Bulletin 27-DM.



Flexiblade®



Warren-Dilts Air Doctor



Magnetic Metering Bar

DILTS DIVISION
Fulton, New York
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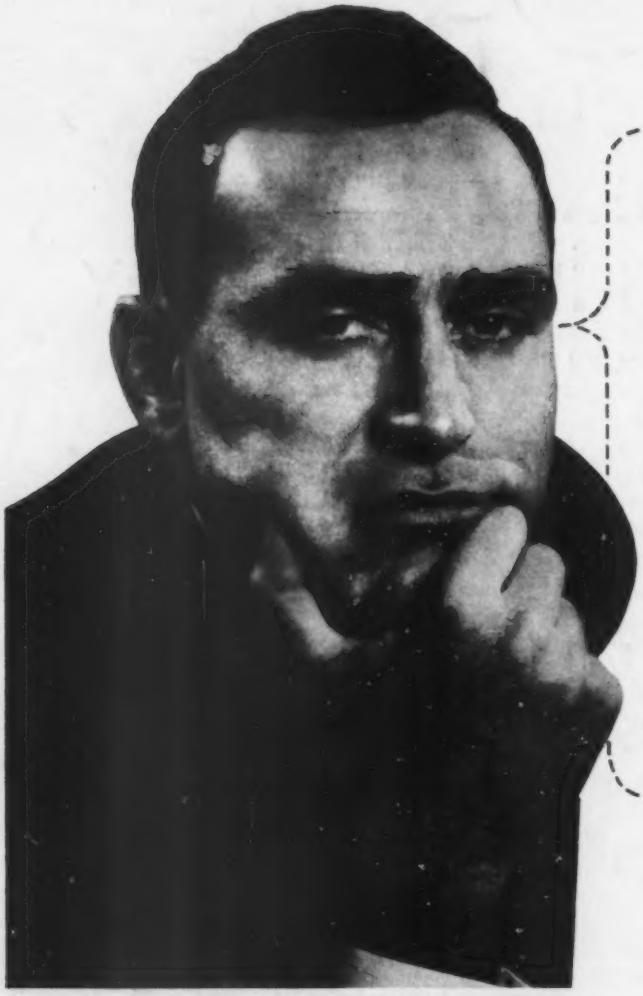
Thinking of coating or filling with clay?



Should we use a trailing blade... or an air knife?

Maybe it should be a roll coater... or a reverse roll?

What about a size press?

Double coating? Simultaneous or successive?

On or off the machine?

Wet or dry storage?

Fill at the secondary headbox?

Best place to furnish the clay?

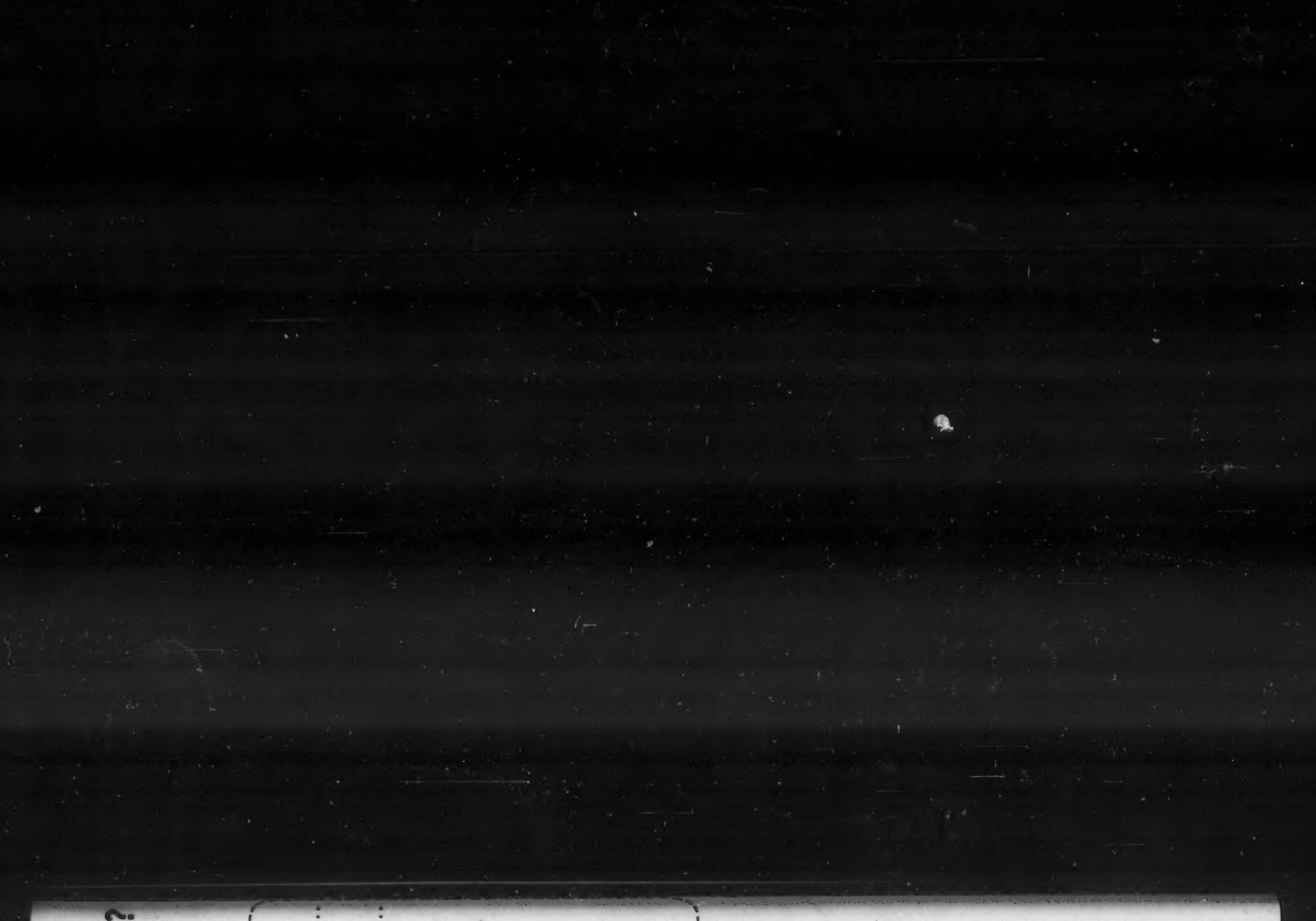
There are plenty of tough decisions to make when it comes to coating or filling paper with clay. Using clay successfully involves a lot more than selecting a grade.

You'll find the Georgia Kaolin Company furnishes a lot more than just quality clay. The important extra is technical service. Georgia Kaolin has helped many companies, large and small, in solving problems of clay handling, clay make-down and coating-color formulation.

Georgia Kaolin technical assistance goes beyond ideas and opinions. The Sales Service Department operates pilot coating machines which can demonstrate the effects, on your own raw stock, of different formulations and various methods of coating. These facilities, plus Georgia Kaolin knowledge and skill, can be an all-important adjunct to your own research.

START BY CONTACTING US.

Georgia Kaolin Company 433 North Broad St., Elizabeth, N. J.

Fine clays from the world's largest kaolin plant

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